BI Norwegian Business School - campus Oslo

GRA 19502

Master Thesis

Component of continuous assessment: Thesis Master of Science

The Return to Risk Tradeoff in Norwegian Family Firms

Navn:	Arne Torjus Wist Lauvdal, Marius Børke

Start:	02.03.2018 09.00
Finish:	03.09.2018 12.00

Master Thesis

‹‹The Return to Risk Tradeoff in Norwegian Family Firms››

By
Arne Torjus Wist Lauvdal & Marius Børke

Supervisor
Leon Bogdan Stacescu

Date of submission
03.09.2018

Programme
MSc in Business: Finance 2016-2018

BI Norwegian Business School

Abstract

In this master thesis we investigate whether a tradeoff between return and risk exists for Norwegian non-listed family firms. Financial theory suggests that higher performance in terms of return on an asset comes as a compensation for a higher level of risk on that asset. Since the family relation between the controlling owners of the firm, and or between the owners and the CEO, may induce other incentives and motivations regarding return and risk preferences, this relationship seems to break when it comes to non-listed family firms in Norway.

Previous literature is rather narrow by only separating between family and non-family firms. In order to provide more transparency to the topic and new contribution to literature, we define four different types of family firms. The entrepreneurial family firms are where a single owner is also CEO, and the firm age is not above ten years. The single owner family firms are where the owner is also CEO and the firm age is above ten years. Further, we define the classical family firms where there is more than one owner from a family where that family has ultimate ownership above 50%. For the classical family firms, we divide between those who have CEO from the family with the largest ultimate ownership and those who do not.

According to theory and previous literature, the different firm types are supposed to behave differently as a result of different governance structures and preferences regarding time horizon for goal setting, profit maximization versus non-financial benefits and possible agency costs. The findings of this thesis suggest that indeed, the different firm types do behave differently, which may seem to have an effect on the return to risk tradeoff. By breaking down the family firm structure in different definitions, we learn that the picture is more nuanced and complex than initially anticipated.

To investigate our hypothesis, the methodology for the core segment of analysis includes pooled least squares models and fixed effects models. For the purpose of robustness tests, propensity score matching models, Heckman self-selection models and switching regressions models are used.

Consenting literature suggests that young entrepreneurial firms take on extensive risk without obtaining the performance to justify it. To investigate whether this relationship holds for the Norwegian firms, an additional cohort study is also conducted. We use the same methodology regarding models, however the sample

is quite different. In this study we compare firms which are born in the same year over five years. The cohort sample also allows us to make descriptive inferences regarding firm survival.

The thesis provides evidence which suggests that all family firms with family CEO, compared to non-family firms, seem to enjoy higher performance, measured by return on assets, while bearing less risk, measured by volatility in revenue. Finally, the entrepreneurial family firms and the classical family firms with family CEO are associated with the highest return to risk ratio. Most intriguing is it that the results from the core analysis and the cohort study find contradicting evidence to the literature which suggests that entrepreneurial firms are burning money. Striking results suggest that the return to risk tradeoff from financial theory may not hold and thus provide evidence to support that family related characteristics indeed have an effect on performance, risk and the return to risk tradeoff.

Acknowledgement

We want to thank our supervisor Leon Bogdan Stacescu for input, comments and feedback throughout the process. We also want to thank the Centre for Corporate Governance Research and especially Ivar Otto Ekker for help during the data extraction process.

Table of Contents

1. Introduction

Family firms exists all over the world and today they account for two thirds of all firms globally and are estimated to create 70-90% of the global GDP (FFI, 2018). The research on family firms mainly describes the relationship regarding performance and risk taking for the family firms compared to non-family firms. It is broadly suggested that the family firms both perform better and at the same time take on less risk when investigated separately. However, according to financial theory, greater returns come as a compensation for greater risk, meaning that in competitive and efficient markets, one cannot have both lower risk and higher returns compared to similar investments. As it seems that the literature on family firms regarding performance and risk does not align with established financial theory, it is highly motivational to investigate whether family firms have a better return to risk tradeoff than the non-family firms. Or even, is it really a tradeoff for the family firms? With this backdrop for the thesis we seek to answer the research question;

"Is there a return to risk tradeoff in the Norwegian family firms?"

In non-family firms, a required return to invested capital through maximized profits is the main goal for the shareholders, generally speaking. Further, the shareholders will have an agent in the firm who runs the firm in their best interest by making optimal decisions on behalf of the owners and not primarily the agent himself. However, in family firms there may be additional dimensions to this picture which might be non-financial or of a more long-term perspective than short-term maximized financial returns only. To shed light on the return to risk tradeoff, it is of great interest to explore the differences in preferences between family- and non-family firms regarding the risk taken on to achieve desired performance.

In the family firms, incentives to chase less risky strategies with long term perspective may be a result of the firm being in the same family for decades where succession and protection of family control has been prioritized. If the family owners are few, and therefore the ownership structure less diversified in order to fully control the firm, excessive risk may lead to devastating outcomes for the family – both financially and socially (McConaughy, Matthews, & Fialko, 2001; Mishra & McConaughy, 1999). In the worst case, a short term risky strategy may destroy a company that has been in the family for a long time. And arguably, taking

that risk and also taking the risk of being the one in the family responsible for a bankruptcy may not be worthwhile.

Regarding the CEOs motivation for risk, literature makes a distinction between the family firms where the CEO is a member of the family with the ultimate control and the family firms with a non-family CEO. The non-family CEO may be more inclined to pursue risky strategies with short-term monetary gains in absence of long-term personal ownership gains (Harris & Ogbonna, 2007). Thus, they might be more motivated to take on more risk in order to succeed. On the other hand, the family CEO may be more motivated to protect the long-term personal ownership gains and socioemotional wealth on behalf of himself and the family (Huybrechts, Voordeckers, & Lybaert, 2013).

When it comes to differences in performance between family- and non-family firms, established theory and literature often explain this by agency theory, adverse selection and the pecking order theory, which all explain the implications of information asymmetry for performance.

Agency theory describes how information asymmetry may have implications on different levels in the firm. For the family firms with more than one owner from the same family, the conflict between the shareholders may be lower than for other ownership structures. Further, if the CEO is also from the family with the largest ultimate ownership and control, the conflict between principal and agent might be lower than for others. Alignment of incentives and a shared long-term perspective, may reduce agency costs resulting in efficient management, sound investments and finally higher performance (Jensen & Meckling, 1976).

To perform well, a highly profitable investment opportunity and business model is fundamental. In order to find out how family firms obtain and succeed in this area, the theory of adverse selection and the lemon problem (Akerloff, 1970) may provide reasoning. If family members engage in profitable and promising investment opportunities by sourcing financing within the family, they have the full control and unique information about the value of the firm. If they are considered peaches, as described by the theory, they may not be valued correctly from outside investors due to information asymmetry. In turn, equity may have to be sold at discount, which may further induce strong motivation not to sell equity and seek non-family investors.

As an extension of adverse selection, Myers & Majulf (1984) describe financing decisions for the firm by the pecking order theory. Since an investment opportunity may be unique and unavailable to other market participants, the family has further motivation to maintain control over the company. The implication may be that financing is primarily sourced from internal funds, followed by debt and lastly, the least desirable choice, issuance or sale of equity. The reasoning is that creditors only require their money back in terms of down payment and interest rates. However, new equity investors may require some portion of the control and also proportional return to all marginal profit, making issuance or sale of equity the most expensive choice. Thus, one may assume that the family firms have unique investment opportunities which they are highly motivated to keep to themselves, rather than becoming non-family firms by selling equity, and therefore appear as stronger performers.

The aforementioned reasons for why the family firms prefer less risk but at the same time may be likely to perform better than the non-family firms give reason to believe that the return to risk tradeoff is actually absent. However, this assumption may not apply to all family firms as the definition of a family firm is varying and may be more fine-grained.

In this thesis, the family firms are divided into four sub groups. First, the classical family firms who have an ultimate ownership above 50% and have a CEO from the family with the largest ultimate ownership. This group is assumed to take little risk and also perform well due to little conflict between the owners and the CEO.

Then, we have the classical family firms with more than 50% ownership but have a CEO from outside of the family. For these firms, agency costs due to the agent-principal conflict may arise, and they are assumed to perform worse and take on more risk than the other classical family firms.

Further, we look to the entrepreneurial family firms. These firms have one owner which is also the CEO and the firm age is maximum ten years. They are defined as family firms since they share properties with the classical family firm with family CEO. Particularly regarding absence of agency cost. It is motivating to investigate this type of firms in the light of being family firms. As literature describes entrepreneurs as less risk averse and weaker performers (Hvide & Panos, 2014), it is of great interest to investigate what sort of return to risk tradeoff they might have

compared to other firms. Further, the entrepreneurial firms are assumed by literature to burn money and thus have a higher probability of going bankrupt.

Lastly, the single owner family firms are those who have one owner who is also CEO, but the firm is older than ten years. The firms might have been entrepreneurial family firms, however when they reach a certain age we cannot justify that they really are entrepreneurial anymore. The owner and CEO may still have the same incentives to maintain the ownership structure as the entrepreneurial family firms. However, since these firms are in a more mature state and the CEOs are on average the oldest among the four groups, they might have other preferences regarding risky strategies and performance.

The main results in the thesis suggests that all groups of family firms, with exception of the classical family firms without family CEO, outperform the non-family firms in terms of return on assets. This result supports agency theory by suggesting that reduced agency cost enhance performance in family firms with family CEO.

Moreover, all groups of family firms, with exception of the classical family firms without family CEO, also seem to be associated with lower levels of risk than the non-family firms in terms of volatility in revenue. Again, the results support the literature which may explain this relationship by lower ownership diversification and higher personal investments. Furthermore, the entrepreneurial family firms seem to be associated with the highest risk among the three firm types with family CEO. Regarding the entrepreneurial family firms this result is exciting, since it is contradicting to predictions based on previous literature.

The findings regarding performance and risk suggest that the three types of family firms with family CEO should have a better return to risk tradeoff as well. Furthermore, we do find evidence that they are also associated with a better return to risk ratio. These results indicate that the return to risk tradeoff might actually be absent, since the firms which are associated with the highest risk are not the ones who perform the best. The finding seems to support literature by Naldi, Nordqvist, Sjöberg, & Wiklund (2007) who found a negative relation between return and risk in Swedish SMEs. Further, maybe the most intriguing result is that the entrepreneurial family firms seem to enjoy great return to their level of risk. This is in strong contradiction to Hvide and Panos (2014) who explore and confirm a

consenting view that entrepreneurial firms take on more risk but at the same time perform worse than other firms.

In general, family firms seem to have the most favorable relationship between return and risk compared to non-family firms. The most profound contribution to literature is that this thesis examines the more fine-grained definitions of different family firms in relation to the return to risk tradeoff. This is new contribution to literature and has led to new interesting findings. For most of the literature we do find support. Surprisingly, and the most intriguing part is that we indeed find evidence which contradicts the literature in regard to how the entrepreneurial family firms behave and what we expected to find. This suggests that the definition of family firms is important in order to discover that the world of family firms may be more nuanced and complex than previously anticipated.

2. Literature Review

Definition of Family Firms

In our research, we will define four different types of family firms, as the main purpose of the thesis is to investigate the return to risk tradeoff for the different types of family firms in Norway. Defining the family firms will be a natural place to start the literature review, as basis for the intuition and further understanding.

In the literature, definitions of family firms are varying in order to serve its purpose. Indeed, a study by Chua, Chrisman and Sharma (1999) on defining family firms, found 21 different definitions. Further, Miller, Le Breton-Miller, Lester and Cannella (2007) find no less than 28 different definitions, and emphasize how sensitive analysis are to the definition. However, family business attributes are often related to one of three components: family, ownership and business. The definitions depend on the overlap between the three components (Gersick, Davis, Hampton, & Lansberg, 1997; Rettab & Azzam, 2011).

Due to the nature of our data and the scope of our thesis, we make concrete definitions which distinct between four different types of firms: the classical family firm with family CEO, the classical family firm without family CEO, entrepreneurial family firm and the single owner family firm. We also have the control group of non-family firms.

Classic family firm with family CEO

- *Firm ownership consists of more than one family member with a combined ultimate ownership above 50%, and the CEO is from the family with the largest ultimate ownership.*

Being a family firm is often associated with a family of more than one owning the firm as well as managing it. In literature this definition is quite common as it is a large group of firms. However, the majority fraction of ownership may vary so we define the lower limit to be ownership above 50% for the family, thus being majority shareholders.

Classic family firm without family CEO

- *Firm ownership consists of more than one family member with a combined ultimate ownership above 50%, but the CEO is not from the family with the largest ultimate ownership.*

These companies are assumed to be quite similar to the aforementioned classical family firms with family CEO, however literature suggest that having an outside CEO may have implications on performance and risk. Thus, we are motivated to investigate the difference in performance and risk between these two groups.

Entrepreneurial family firm

- *Firm ownership consists of one family member with the total ultimate firm ownership and that person is also the CEO. The firm is not older than ten years.*

In previous literature, entrepreneurial firms have been objects for research with respect to risk and performance. They have been found to take on more risk than other firm types and at the same time perform worse. In order to capture the assumed innovative and unsteady state characteristics for the entrepreneurial firms, we impose the ten-year company age restriction. The described return to risk tradeoff and that the literature on entrepreneurial firms in the role of being family firms is not very rich, motivates us to contribute on the topic.

Entrepreneurial firms where the owner is also CEO are assumed to inherent some of the same characteristics as the classical family firms with multiple family owners, due to motivation and incentives for the owner. Further, we find the entrepreneurial family firms to be a quite large group in Norway, thus being particularly interesting to explore.

Single owner family firm

- *Firm ownership consists of one family member with the total ultimate firm ownership and that person is also CEO. The firm is older than ten years.*

The single owner family firms who might have started as entrepreneurial family firms, are re-defined after ten years because they are assumed to have reached a steadier state and have different motivations to operate than the more entrepreneurial new-born firms. Furthermore, with definitions of entrepreneurship from literature in mind, we cannot justify a firm being categorized as entrepreneurial after ten years of operations.

Control group – non-family firms

- *Firm* ownership *consists of family ownership below 50%.*

The control group of non-family consists of firms where there are not families with majority stake. Thus, we constrain the family firm ownership to be below 50%. and

remove the constraint regarding whether or not the CEO is from the largest family. This imply that the non-family firms may share some of the main characteristics as the classical family firms without family CEO. The fact that the controlling shareholders and the CEO do not share the family connection, they might be subject to a higher degree of agency conflict and thus being a counterpart to the classical family firms with family CEO.

Performance – family firms versus non-family firms

We start with the outer layer and explore the differences in performance between family- and non-family firms. Sraer and Thesmar (2007) wrote a paper that empirically documents the performance and behavior of family firms listed on the French stock exchange between 1994 and 2000. Their main findings in the paper were that family firms outperformed non-family firms. This is in consensus with other infant literature that founder-managed firms, as well as family firms run by an outside CEO, outperform non-family firms, when comparing profitability in the North-America region. In their research on family firms in The United States, Anderson and Reeb (2003), Amit and Villalonga (2006) and Perez-González (2006), support this view.

Fama and Jensen (1983) argued that high concentration of ownership in hands of one entity may adversely affect the performance, which is later backed by Pound (1988). By pursuing personal goals, the controlling largest shareholder entity might expropriate funds from other stakeholders including employees and minor shareholders, hence compromise the performance of the company (Crama, Leruth, Renneboog, & Urbain, 2003).

Berzins, Bøhren and Rydland (2008) analyzed a wide range of corporate finance and governance characteristics in the data on active Norwegian firms with limited liability over the period 1994-2005. This sample includes about 77,000 non-listed firms and 135 listed firms per year. First, they found that ownership concentration is much higher in non-listed firms, particularly when persons control them. Concentration decreases with firm size, but is still very high even in large non-listed firms (Berzins et al., 2008). Secondly, a contradiction to Fama and Jensen, that the operating performance (ROA) is higher when personal ownership is high and if the firm is non-listed. In addition, Che and Langli (2015) contribute in their study on Norwegian non-listed family firm. They show that family firm performance

measured by ROA is higher for firms with low family ownership, 50% to 67%, and high ownership, 100%, but lower in between.

Jaskiewicz and Klein (2005) reported in their family business performance overview that of 41 studies, family firms outperform non-family firms in 25 studies, in 5 studies it was the opposite and 11 studies gave no significant result. Dyer (2006) suggests that this difference comes from different approaches and definitions of family enterprises.

Performance – within the family firms

One of the most discussed issues within family firms is the decision regarding family versus non-family CEO. From a theoretical perspective, the impact of family CEOs on performance is ambiguous (Donnelley, 1964). Davis, Schoorman and Donaldson (1997) and Kandel and Lazear (1992) states that since family CEOs are exposed to higher economic upside associated with firm success than other CEOs, they could perform better. Further, Donnelly (1964) states that family CEOs might also have hard-to-obtain firm specific knowledge and higher levels of trust from key stakeholders.

Another argument is related to the family CEO`s absence of "short-termism" compared to other CEOs, meaning that family-CEOs might be better at maintaining the long term focus (Cadbury, 2000).

On the other hand, family CEOs might underperform because of tensions between family and business objectives (Barnes & Hershon, 1989; Christiansen, 1953; Lansberg, 1983; Levinson, 1971), but maybe most importantly, because of the fact they are selected from a small pool of managerial talent (Burkart, Panunzi, & Shleifer, 2003; Pérez-González, 2006).

When investigating a performance measure like ROA the results underscore the negative impact of family CEOs on firm performance (Bennedsen, Nielsen, Perez-Gonzalez, & Wolfenzon, 2007). Hence, we will investigate whether family firms with family-CEO perform better than family firms without family-CEO.

Risk – family firms versus non-family firms

It is an interesting and a necessary contribution to investigate the family firm risk preference. Naldi, Nordqvist, Sjöberg, and Wiklund (2007) provide contribution to risk taking as one important dimension of entrepreneurial orientation and its impact in family firms, drawing on a sample of Swedish SMEs. They find that even if

family firms do take risks while engaged in entrepreneurial activities, they take risk to a lesser extent than non-family firms.

Risk – within family firms

Further, Frank H. Knight (1921) states that less risk averse individuals are more likely to start up a firm. Research by Hans K. Hvide and Georgios A. Panos (2014) suggest that risk tolerant people are more likely to become entrepreneurs. The reason being that less risk averse individuals would be willing to accept lower expected entrepreneurial risk. The study uses proxies to capture risk preference and compares this to performance of firms started up by individual with high risk tolerance. And indeed, they find evidence that these firms perform worse. This suggests that "more risk tolerant individuals are more inclined to start up a firm but of poorer expected quality than less risk tolerant individuals" (Hvide & Panos, 2014).

Further, Kanbur (1979) and Kihlstrom and Laffont (1979) support the hypothesis that less risk averse individuals become entrepreneurs and more risk averse individuals become workers. The workers are paid risk free fixed wages, while the entrepreneurs are receiving a risky return.

Regarding family versus non-family CEO, there are multiple reasons to believe that family CEOs are more risk averse than non-family CEOs in the family firms. According to McConaughy Matthews and Fialko (2001), Mishra and McConaughy (1999), family members tend to have a very high financial investment in the firm because their desire to maintain control makes them use little debt and choose low-risk capital structures. Consequently, the financial burden of investment failure is concentrated within a small group of owners, i.e. low diversification of the risk.

Non-family CEOs might not have any ownership at all, resulting in absence of personal financial risk (Huybrechts et al., 2013). Moreover, the goal of most family firms is to keep the control in the family and pass it on to later generations (Poza, 2013). This concern and financial burden will be less dominant for the non-family CEOs.

Besides financial considerations, family CEOs and nonfamily CEOs also differ in the value they attach to the firm's socioemotional wealth (Huybrechts et al., 2013). A family CEO is likely to be more concerned than a nonfamily CEO for the protection of the family's socioemotional wealth. Moreover, watching over the family's socioemotional wealth will benefit the family CEO's job security, as

maintaining the family's ability to exercise control allows for appointing and favoring family members in the firm (Gomez-Mejia, Cruz, Berrone, & De Castro, 2011).

A nonfamily CEO, on the other hand, might have to find other ways to increase his or her job security. Indeed, the CEO can make himself or herself more valuable to the owners and costly to replace by investing in innovation and new projects (Shleifer & Vishny, 1989). With these reflections in mind, it is reasonable to believe that a family CEOs are interested in lowering the idiosyncratic risk, while a non-family CEOs are interested in pursuing a higher risk investment strategy (Harris & Ogbonna, 2007).

Return to Risk Tradeoff – family firms versus non-family firms

The general financial perspective on the return to risk tradeoff, everything else being equal, is that higher risk is compensated by higher return. However, people are assumed to start a new company based on an investment opportunity yielding return in excess of market return. Hence, as the opportunity is not available for all participant in the market, the general standard assumption in financial theory of perfect competition in the market does not hold. In these particular cases, if the investment opportunity is unavailable to the open market, it is unclear whether the classical return to risk tradeoff holds.

Drawing on the empirical results of Naldi, Nordqvist, Sjöberg, and Wiklund (2007), we find that their most important contribution for the return to risk tradeoff in family firms is that risk taking in family firms is negatively related to performance.

Return to Risk Tradeoff – within family firms

In the article, Naldi, Nordqvist, Sjöberg, and Wiklund recognize that family firms constitute a heterogeneous group, and emphasize that further research investigating the link between risk taking and performance in family firms will benefit from a more fine-grained distinction between different types of family firms (Naldi et al., 2007).

Previous research has found that entrepreneurs, in particular, earn less and bear more risk than people receiving salaries (Hamilton, 2000). Moskowitz and Vissing-Jørgensen (2002) documents the return on investing in U.S. non-publicly traded equity. Their main finding is that an entrepreneurial investment is extremely concentrated. Yet, despite its poor diversification, they find that the returns to

private equity are no higher than the returns to public equity. Hence, it is puzzling that given the large equity premiums in the public market, households are willing to invest substantial amounts in privatively held firms that apparently have far worse return to risk tradeoff.

Hans K. Hvide and Georgios A. Panos (2014) suggest that risk tolerant people are more likely to become entrepreneurs and perform worse. Since entrepreneurs may be prone to more willingly take on risk and still earn less money, researchers within behavioral finance have come up with some prevailing explanations on the subject. For example, entrepreneurs may enjoy the nonpecuniary benefits, as ultimate control, thus accepting lower returns. They may just stay in charge and be their own boss and barely keep the wheels turning, while at the same time emptying their money bag. Blanchflower and Oswald (1992) find in their studies on the British and US market in the early 1970´s to the 1990´s that entrepreneurs have indeed higher levels of well-being than employees. This gives implication to the return to risk tradeoff, that these people might be happy with a worse tradeoff.

Another example is that people like a great success story, and entrepreneurs may have a preference for skewness (Kraus & Litzenberger, 1976), as the stories of failure in general outnumber the stories of success. The last argument is that some are overconfident in their new investment opportunity (Bernardo & Welch, 2001; Cooper, Woo, & Dunkelberg, 1988).

3. Main Hypotheses

With previous literature in mind, three segments of hypotheses are developed to investigate the family firm types in relation to performance, risk and the return to risk tradeoff, in order to answer the main research question in this thesis.

"Are there a return to risk tradeoff in the Norwegian family firms?"

First Segment

Hypothesis H1A

Question: Are family firms associated with higher performance, in terms of return on assets, than non-family firms?

H0: Family firms are not associated with a higher performance than non-family firms

HA: Family firms are associated with a higher performance than non-family firms

Hypothesis H1B1

When comparing performance, previous studies typically differentiate between family and non-family, as we do test in H1A. However, implications from this practice is that different firm characteristics which may lead to better or worse firm performance are not specified, resulting in low transparency (Dyer, 2006). In order to cope with these implications, we go further by exploring a more unknown terrain, which will be dedicated the main focus of this thesis. Namely, which type of family firm perform better?

Question: Are family firms with CEO from the family with the largest ultimate ownership associated with higher performance than the firms with a non-family CEO?

H0: Firms with family CEO are not associated with higher performance than firms without family CEO

HA: Firms with family CEO are associated with higher performance than firms without family CEO

Hypothesis H1B2

Further, Hvide and Panos (2014) confirm theoretical tradition when examining that entrepreneurs perform worse. To bring more transparency to the family firm dimension, we will examine how the three types of family firms that have a family CEO perform compared to firms without family CEO. The hypothesis is equal to H1B1, but we include dummy variables for all four family firm types to investigate the matter. This will be referred to hypothesis H1B2.

Second Segment

Hypothesis H2A

We will in this segment investigate whether there is significance to the relationship between Norwegian non-listed family firms and risk. In this thesis, the measure of risk is defined as volatility in revenue.

Question: Are family firms associated with lower risk than non-family firms?

> **H0:** Family firms are not associated with less risk than non-family firms
>
> **HA:** Family firms are associated with less risk than non-family firms

Hypothesis H2B

On the basis of literature regarding risk preferences, we summarize by hypothesizing that entrepreneurial family firms and classic family firms with non-family CEO, are less risk averse than classic family firms with family CEO and single owner family firms. Moreover, entrepreneurial family firms to the greatest extent.

Question: Are classical family firms with family CEO and single owner family firms are associated with less risk than entrepreneurial family firms and classical family-firms with non-family CEO?

> **H0:** Classical family firms with family CEO and single owner family firms are not associated with less risk than entrepreneurial family firms and classical family-firms with non-family CEO
>
> **HA:** Classical family firms with family CEO and single owner family firms are not associated with less risk than entrepreneurial family firms and classical family-firms with non-family CEO

Third Segment

Hypothesis H3A

Naldi, Nordqvist, Sjöberg, and Wiklund (2007) provide an intriguing contribution to shed light on the return to risk tradeoff within family firms in Sweden. This motivates us to explore whether the same relationship is persistent in Norway. So, in addition, we want to look at not only SMEs, but all non-listed firms in Norway.

The return to risk ratio is defined as return on assets (ROA) less the risk-free rate to the standard deviation of ROA for the observed firm. A higher number indicates a better and more favorable return to risk ratio. The measure will serve as the dependent variable when investigating the relation between performance and risk.

Question: Do family firms have a better return to risk tradeoff than non-family firms?

> **H0:** Family firms are not associated with a higher return to risk ratio than non-family firms
>
> **HA:** Family firms are associated with a higher return to risk ratio than non-family firms

Hypothesis H3B

As an additional contribution, previous literature motivates us to investigate the return to risk tradeoff for the entrepreneurial family firms compared to the other types of family firms.

Question: Do entrepreneurial family firms have a worse return to risk tradeoff than other types of family firms?

> **H0:** Entrepreneurial family firms are not associated with a lower return to risk ratio than other firm types
>
> **HA:** Entrepreneurial family firms are associated with a lower return to risk ratio than other firm types

4. Theory

Agency Theory

For family firms without family CEO, the potential agency conflicts between owners and managers may arise. In our sample, a fairly large part of the observations are entrepreneurial family firms and family firms with family CEO. This introduces another type of agency conflict we have to address, the agency conflict between majority and minority shareholders.

Regarding family firms, agent theory is prominent and almost inevitable. Jensen and Meckling (1976, p. 308) "define an agency relationship as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent". This relation is much discussed due to the problem arising due to conflicts of interest between the principal(s) and the agent, introducing the concept of agency cost. Based on Jensen and Meckling´s definition,

Fama and Jensen (1983, p. 304) states that "agency problems arise because contracts are not costlessly written and enforced. Agency costs include the costs of structuring, monitoring and bonding a set of contracts among agents with conflicting interests. Agency costs also include the value of output lost because the costs of full enforcement of contracts exceed the benefits". In other words, agency cost might be defined as the sum of the monitoring expenditures by the principal, the bonding expenditures by the agent and the residual loss (Jensen & Meckling, 1976, p. 308).

Agency theory will be useful in inference of the analysis regarding the family or non-family CEO distinction between the family firms. In more detail, the agency problem is categorized between different problems. Agency problem one (A1) arises between the owner and the manager of the firm (Villalonga & Amit, 2006). In short the problem is that the manager (agent) does not have the same incentives as the owner (principal), and might use the invested capital in his best interest rather than in the owner´s best interest (Shleifer & Vishny, 1997). Agency problem two (A2) (Villalonga & Amit, 2006) arises between the controlling shareholders (or families) and the minority shareholders (Bhaumik & Gregoriou, 2010). More concretely, majority shareholders might use their voting rights to expropriate

private benefits in addition to the dividends which are the only return to the minority shareholders.

Stewardship Theory

Stewardship theory suggest that family CEO, regardless of ownership, will generally behave in the firm's best interest, i.e. goal of the principal and agent is aligned and that the agent acts as a good steward in the interests of the principal (Davis et al., 1997). Family managers are presumed to behave this way because they share the same personal goals as to family goals, pursuing non-financial goals and behave according to the relational agreements that governs the family firm behavior (Corbetta & Salvato, 2004).

Contradictions in Agency- and Stewardship Theory

The two theories have conflicting implications on family firm behavior, regarding the mechanism on agency cost control on family CEO. The two theories predict different outcomes. By agency theory, if the family CEO behaves more like an agent, one should observe that agency cost control mechanisms being imposed on family CEO, hence improving the results. On the contrary, according to the stewardship theory, if family CEO behave more like a steward, then one should observe absence in imposition of agency cost control mechanism, thus family CEO and firm performance will have a negative relationship.

Information Asymmetry

To address the problem of information asymmetry by turning to adverse selection, an often-used metaphor is the buyer and seller of used cars, often referred to as the lemon problem (Akerloff, 1970; Brealey, Leland, & Pyle, 1977). In our case it is the relationship between the buyer and seller of a firm.

An entrepreneur starts a company and wants to get external financing simply in order to become more diversified. Due to information asymmetry, the potential investors are not sure about the quality and true value of the firm. Further, it is reasonable that bad firms are more willing to sell equity stakes to somebody else. If the firm have a god investment opportunity the initial investors will keep it for them self, diversification is less attractive. The friction progresses when outside investors cannot tell the difference of peaches (good firms) and lemons (bad firms). Thus, firms which are peaches have to sell equity at a discount to be attractive. To show the investors how good the opportunity is, the new investors must receive

very good terms. Like IPO underpricing, compensating investors who are afraid of overpaying, is often referred to as the "winners curse".

The Pecking Order Theory

In accordance with the lemon problem, Myers and Majluf (1984) came up with the theory of pecking order. It is a hierarchy of financing where the firm is assumed to prefer to finance new investment opportunity with retained earnings, then issue debt, lastly issue equity.

The first argument being that the retained earnings, which are already in the company, are less troublesome to use as source of financing, since these financing decisions are less influenced by shareholders and creditors.

The second argument is that the creditors do not care about the excess return in the company as long as the company make enough to cover their debt.

Lastly, shareholders require proportional returns to their portion of equity in the company on every marginal dollar made. Hence, shareholders care about each and every small change in performance, unlike the creditors that only care about the debt repayment. Therefore, issuing equity is the most expensive way to finance the project.

The takeaway is that if a family firm has a very good investment opportunity and the funds to finance it, the company may rather prefer to fully finance the investment opportunity with internal funds, since it performs well. If the company was to source their financing from outsiders in terms of issuing shares, the company's investors would need to sell shares at a discount. Then the question is why they would do so. The benefit of keeping the investment opportunity within the family is assumed to be greater than the cost of not being well diversified.

This might give an implication to why we might find entrepreneurial family- and family firms that finance themselves to perform better than non-family firms. The reason being that the firms that are still within family might be considered as peaches (better performers) rather than lemons (bad performers).

5. Empirical Methodology

We will explore our hypotheses using the data set described in part four containing accounting and management information on limited liability non-listed companies in Norway in the period 2000 to 2015. We will do so by applying our own models and regressions to test whether there are grounds to support hypotheses.

Panel Data

Since we have access to the unique data-set from Norway, we wish to take advantage of the possibilities provided by panel data. By using panel data, we will be able to explore the complexity of our problems and look at how the variables and the relationship between them change dynamically over time. Also, this will give us a lot more data points than using time-series data only.

Endogeneity

Over the years, studies within corporate finance and -governance have been struggling with the nuisance of endogeneity. In corporate governance, especially studies from the last 10-15 years, the challenges regarding endogeneity has been more addressed than earlier. Endogeneity arises from different sources and might be challenging to get rid of. Moreover, it might be even harder to formally prove that it is taken properly care of. Since there are no formal tests for endogeneity, we will conduct robustness test in order to produce high quality results.

In order to address endogeneity, which is inevitable, we will try to define it as concretely as possible. If we assume the regression

$$Y = \alpha + \hat{\beta}_1 X_1 + \cdots + \hat{\beta}_k X_k + \varepsilon$$

We want $E(\varepsilon|X_k) = 0$, meaning that there is no correlation between the variable X and the error term, ε. However, if we instead have $E(\varepsilon|X_k) \neq 0$, we indeed have endogeneity resulting in biased estimates of β_k, which means that $E(\hat{\beta}_k) \neq \beta_k$. In short, the mean value of β will not converge to the true value of β if the process is repeated many times. The sources of endogeneity may be divided in three; omitted variable bias, simultaneity and measurement error.

Omitted variable bias arises when there are variables that explain the true generating process, but are not included in the regression (Brooks, 2014). Consequently, the estimated coefficients on all other variables will be biased and inconsistent, unless the excluded variable is uncorrelated with all included variables. Even if this condition is satisfied, the estimate of the coefficient on the

constant term will be biased, resulting in biased results from the model. Further, the standard errors will also be biased, making inference form hypothesis testing inappropriate.

In our case, when estimating variables that may be highly explained by unobserved factors which are not retrieved or not even possible to measure, omitted variable bias is challenging to avoid. Still, we will try to mitigate this problem by including relevant variables in our models. It is important to keep in mind that there are costs and benefits of including more variables. If the additional variable is omitted, we might end up with bias. However, if we include a variable that does not belong in the model, that is, when the population regression coefficient is zero, the precision of the estimators of the other regression coefficients is reduced (Stock & Watson, 2015). However, the bias as a result of omitted variables are possibly bigger.

The other source of endogeneity, simultaneity or reversed causality, may arise in a regression of Y on X when, in addition to the causal link of interest from X to Y, there is a causal link from Y to X. This reverse causality makes X correlated with the error term in the population regression of interest (Stock & Watson, 2015). As an example, when estimating return on assets on the explanatory variable leverage among others, these two may be a function of each other with causality running both ways. Instead, in this example, we will use lagged variables of X to reduce the simultaneity.

Lastly, we have the issue of measurement error. Measurement error of the dependent variable is problematic since the error is correlated with the independent variable. In our case, when for example estimating ROA for family firms, we measure ROA with error and the error is correlated with being a family firm. That means that family firms may have higher ROA than non-family firms, but not necessarily because they are more profitable. Because they are family firms with limited amounts of money to invest within the family, or they have more intangible assets which do not show up on the balance sheet but create high earnings, there are errors in the measurements of ROA conditional on being a family firm. To reduce the effect of measurement error as a source of endogeneity we include control variables such as asset intensity, tangibility and industry variables.

Multicollinearity

When the data are the result of an uncontrolled experiment, many of the economic variables may move together in systematic ways (Hill, Griffiths, & Lim, 2012). Such variables are said to be collinear and the problem can be labelled collinearity, or multicollinearity (Davidson & MacKinnon, 2009). Severe multicollinearity can impose a problem in the data because it increases the variance of the coefficient estimates and make the estimates sensitive to small changes in the estimation model. Thus, making the variables unstable and difficult to interpret. The variables in our data do not have high correlation and it does not seem to be a problem with multicollinearity. See appendix 5 for complete correlation matrices.

Pooled Least Squares

In a pooled model, the data on different individuals are pooled together and individual differences that may lead to different coefficients are not considered. In other words, the coefficients, β, are not denoted with time or individual subscripts, since they are assumed to be constant for all individuals in all time periods, and do not allow for possible individual heterogeneity.

However, the dependent variable and the explanatory variables are denoted with subscript t for tth time period and i for the ith individual. When applied into a pooled model, the least square estimator is referred to as pooled least squares (Hill et al., 2012). The pooled model is defined in detail in appendix 2.

One of the assumptions for the model is that there is no correlation between errors for the same individual. In panel data, this assumption is unrealistic. So, to deal with this, we relax this assumption by instead assuming that the within-individual correlation is non-zero. This also relaxes the assumption of homoskedasticity, which is described in more detail in appendix 2 and we assume the errors for different individuals are uncorrelated (Hill et al., 2012).

The consequences of using pooled least squares with presence of heteroskedasticity and non-zero correlation over time for the same individual are that the estimators are still consistent, but the standard errors are not correct. In turn, hypothesis tests based on these errors are invalid. In our case we will deal with this by using cluster-robust standard errors, which we will also use in our fixed effects models. In order to control for time invariant effects, we will include industry dummies in our models along with growth in GDP which will control for time effects across all individuals.

Main Regression Models

For the three segments, the main pooled least squares regression models are presented with respect to each hypothesis.

Performance

H1A

$$ROA_{i,t} = \beta_1 + D_1 Familyfirm_{i,t} + \beta_2 Companysize_{i,t-1} + \beta_3 Volatiliyinrevenue_{i,t} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_2 AFFM_{i,t} + D_3 MACH_{i,t} + D_4 ENGY_{i,t} + D_5 ICOR_{i,t} + D_6 LOGI_{i,t} + D_7 TRAD_{i,t} + D_8 SERV_{i,t} + D_9 HEDU_{i,t} + e_{i,t}$$

H1B1

$$ROA_{i,t} = \beta_1 + D_1 FamilyCEO_{i,t} + \beta_2 Companysize_{i,t-1} + \beta_3 Volatiliyinrevenue_{i,t} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_2 AFFM_{i,t} + D_3 MACH_{i,t} + D_4 ENGY_{i,t} + D_5 ICOR_{i,t} + D_6 LOGI_{i,t} + D_7 TRAD_{i,t} + D_8 SERV_{i,t} + D_9 HEDU_{i,t} + e_{i,t}$$

H1B2

$$ROA_{i,t} = \beta_1 + D_1 Entrepreneurialfamilyfirm_{i,t} + D_2 Singleownerfamilyfirm_{i,t} + D_3 Classicalfamilyfirmwithfamily CEO_{i,t} + \beta_2 Companysize_{i,t-1} + \beta_3 Volatiliyinrevenue_{i,t} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_4 AFFM_{i,t} + D_5 MACH_{i,t} + D_6 ENGY_{i,t} + D_7 ICOR_{i,t} + D_8 LOGI_{i,t} + D_9 TRAD_{i,t} + D_{10} SERV_{i,t} + D_{11} HEDU_{i,t} + e_{i,t}$$

Risk

H2A

$$Volatilityinrevenue_{i,t} = \beta_1 + D_1 Familyfirm_{i,t} + + \beta_2 ROA_{i,t-1} + \beta_3 Companysize_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_2 AFFM_{i,t} + D_3 MACH_{i,t} + D_4 ENGY_{i,t} + D_5 ICOR_{i,t} + D_6 LOGI_{i,t} + D_7 TRAD_{i,t} + D_8 SERV_{i,t} + D_9 HEDU_{i,t} + e_{i,t}$$

H2B

$$Volatilityinrevenue_{i,t} = \beta_1 + D_1 Entrepreneurialfamilyfirm_{i,t} + D_2 Singleownerfamilyfirm_{i,t} + D_3 Classicalfamilyfirmwithfamily CEO_{i,t} + D_4 Classicalfamilyfirmwithoutfamily CEO_{i,t} + \beta_2 ROA_{i,t-1} + \beta_3 Companysize_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_5 AFFM_{i,t} + D_6 MACH_{i,t} + D_7 ENGY_{i,t} + D_8 ICOR_{i,t} + D_9 LOGI_{i,t} + D_{10} TRAD_{i,t} + D_{11} SERV_{i,t} + D_{12} HEDU_{i,t} + e_{i,t}$$

Return to Risk Tradeoff

H3A

$$Returntoriskratio_{i,t} = \beta_1 + D_1 Familyfirm_{i,t} + + \beta_2 ROA_{i,t-1} + \beta_3 Companysize_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_2 AFFM_{i,t} + D_3 MACH_{i,t} + D_4 ENGY_{i,t} + D_5 ICOR_{i,t} + D_6 LOGI_{i,t} + D_7 TRAD_{i,t} + D_8 SERV_{i,t} + D_9 HEDU_{i,t} + e_{i,t}$$

H3B

$$Returntoriskratio_{i,t} = \beta_1 + D_1 Entrepreneurialfamilyfirm_{i,t} + D_2 Singleownerfamilyfirm_{i,t} + D_3 Classicalfamilyfirmwithfamily CEO_{i,t} + D_4 Classicalfamilyfirmwithoutfamily CEO_{i,t} + \beta_2 ROA_{i,t-1} + \beta_3 Companysize_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 Herfindahlindex_{i,t} + \beta_6 Numberofowners_{i,t} + \beta_7 Assetintensity_{i,t-1} + \beta_8 Companyage_{i,t} + \beta_9 Tangibility_{i,t} + \beta_{10} AgeCEO_{i,t} + \beta_{11} GrowthinGDP_{i,t} + D_5 AFFM_{i,t} + D_6 MACH_{i,t} + D_7 ENGY_{i,t} + D_8 ICOR_{i,t} + D_9 LOGI_{i,t} + D_{10} TRAD_{i,t} + D_{11} SERV_{i,t} + D_{12} HEDU_{i,t} + e_{i,t}$$

Random- or Fixed Effects Model

When dealing with panel data regressions, the fixed effect model is a common methodology. The behavioral differences between the entities, individual heterogeneity, are assumed to be captured by the intercept. The individual intercept from the equation of each entity are included to "control" for entity-specific, time-invariant characteristics. The intercepts are called fixed effects (Hill et al., 2012) and are unobserved effects which do not vary over time, but across entities. If these unobserved effects are not considered, omitted variable bias may arise, resulting in biased estimates.

It is critical to understand that in our case when observing dummy variables, we only observe the effect on the dependent variable when the dummy switches from zero to one. That is, the within firm variation when changing from being one type

of firm to another. For instance, when interpreting how being a family firm, with the variable value one if family firm and zero if not, correlate with performance as the dependent variable, the coefficient for family firm tells us how becoming a family firm is associated with performance and not how being a family firm is associated with performance.

The result of this issue is that when a firm do not change firm type over the sample period, the effect of being a specific type of family firm will be absorbed by the fixed effect. It also means that if a firm change type due to firm characteristics that have an effect on the dependent variable, these characteristics are picked up only when the firm type change due to these characteristics. Therefore, we will only observe the characteristics of a firm when it becomes something else. This is one of the shortfalls of the model, however in combination with the pooled least squares models and several robustness tests, we are confident that the findings will be of strong quality.

When running fixed effects model, we will use clustered robust standard errors because these errors allow the regression errors to have an arbitrary correlation within clusters, firm entities, but assume that the regression errors are uncorrelated across clusters. In other words, the errors allow for heteroscedasticity and arbitrary autocorrelation within an entity but treat the errors as uncorrelated across entities. This is consistent with the second fixed effects regression assumption (Stock & Watson, 2015). The Fixed Effects model is described in more detail in appendix 3.

An alternative to the fixed effects model is the random effects model. Again, the intercepts are assumed to capture all individual differences, but we must also recognize that the individuals in our sample were randomly selected. Thus, the individual effects are treated as random and not fixed as in the fixed effects model.

To determine whether to use fixed- or random effects models in our cases, we use the Hausman Test which compares the coefficient estimates from the random effect model to those from the fixed effect model (Hill et al., 2012). The underlying idea is that both the random effects and fixed effects estimators are consistent if there is no correlation between u_i and the explanatory variable X_{kit}.

If both estimators are consistent, they should converge to the true value of β_k, that is $E(\hat{\beta}_k) = \beta_k$, in large samples and estimates from fixed- and random effects models should be similar. However, if u_i is correlated with X_{kit}, the random effects

estimator is inconsistent, but the fixed effects estimator remains consistent. The fixed effects estimator will converge to the true value of β_k in large samples, that is $E(\hat{\beta}_k) = \beta_k$, but the random effects estimator will not, that is $E(\hat{\beta}_k) \neq \beta_k$.

In short, if the coefficients from in the two models are significantly different, we reject the hypothesis of no correlation between u_i and the explanatory variable X_{kit}, and that random effects can estimate the true values of β_k. Thus, the fixed effects model will help us with generating consistent estimates even though we indeed have the unwelcomed endogeneity.

Selection Bias

In addition to the three aforementioned sources to endogeneity, Stock & Watson (2015) mention sample selection as another threat to the internal validity of multiple regression study. They define as follows; "Sample selection bias arise when the selection process influences the availability of data and that process is related to the dependent variable, beyond depending on the regressors. Sample selection induces correlation between one or more regressors and the error term, leading to bias and inconsistency of the OLS estimator". Heckman (1979) states that sample selection bias may arise for two reasons. First, self-selection by the individuals or data units being investigated or second, sample selection decisions by the analysts.

In our case, if we want to look at performance of for example classical family firms with family-firm CEO, the sample is not a random sample from the population. The sample is selected based on a process that reduce the availability of data on the dependent variable, performance, and that process is related to performance. That is, these firms` performance may be explained by other factors that are not observed, resulting in correlation between one or more regressors and the error term, endogeneity.

Since we use a data set that cover all firms in Norway, the raw data should not be subject to selection bias. However, after filtering our dataset to become a non-random sample, and also look at conditional sub-samples, the assumptions for the classical linear regression model may not hold, due to selection bias. The Heckman self-selection and the switching regressions model generate consistent estimates of the regressors and contribute to valid interpretations of the hypothesis tests. We will also do matching by propensity score in order to control for selection bias. The main distinction between the Heckman selection model and the switching regressions model versus the propensity score matching model is that in the latter, we only

observe the average treatment effect while in the others complete regressions for estimation are provided. These methodologies are introduced in order to test the robustness of our main models.

Rettab and Azzam (2011) highlights that in the 41 studies examined by Jaskiewicz and Klein (2005), none of the studies controlled for self-selection bias and most do not assess differences within and across industries with respect to performance. This means that observed difference in firm performance might be attribute to different business types and industries rather than types of business structure.

Propensity Score Matching

Matching models focus on estimating a treatment effect on the observed data (Prabhala & Li, 2007). The treatment, roughly explained, is the difference between a group that undergo a treatment and a group that does not. The matching models have become increasingly used in applied work, due to its ability to compare firms with similar characteristics in order to determine the isolated effect of being treated

In contrast to the selection models, Wooldridge (2010) formally shows that matching models, such as the propensity score matching, assumes that private information is irrelevant. One might ask if irrelevance of private information is a reasonable assumption. It would clearly depend on the specific application (Prabhala & Li, 2007). The assumption could be quite plausible if the decision to choose X is done through an exogenous randomization process.

However, in our research on non-listed family firms, as a corporate- finance and government application, it becomes less plausible when the decision to choose outcome X is an endogenous choice of the decision-maker, as the CEO for example. In this case it might also be reasonable to assume that there are in fact private information inside the walls of the family held firms, thus it is assumed not be irrelevant.

Even with the assumption regarding private information, matching by propensity score has some interesting applications in our study, functioning as a robustness test. By matching firms based on their observed characteristics, we are able to match firms that are similar. When one firm from the treated group is matched with one firm from the untreated group, the mean treatment effect can be calculated as the average difference in outcomes between the treated and non-treated (Bryson, Dorsett, & Purdon, 2002). In turn this enables us to isolate the effect of a treatment after controlling for all the other characteristics. We will robustness test our main

findings by using the dummy variables for the different family firm types as treatment effects on different sub-samples.

By increasing number of characteristics used in the match, the chance of finding matches reduce. To deal with the issue, Rosenbaum and Rubin (1983) introduced the propensity score, defined as the conditional probability of assignment to a particular treatment given a vector of observed covariates. When matching firms with similar propensity score, more firms may be matched since they do not have to share the same characteristics, but rather the value of the combination of characteristics. In our models, a logit model is used to calculate the propensity scores.

Even when propensity score is utilized, it is still possible that there will be nobody in the non-treatment group with a propensity score that is ‹‹similar›› to that of a particular treatment group individual (Bryson et al., 2002). Thus, one of the assumptions for propensity score matching is common support in the treated and untreated group. The implication is that the sample must have matching observations in the two groups. Therefore, we truncate the main sample with respect to company size in terms of mean revenues. Lower- and upper bounds of NOK7.000.000 and NOK500.000.000, are set respectively.

Heckman Two Step Selection Model

The fixed effects model is assumed to function quite well on panel data. However, as mentioned, time invariant effects such as remaining one type of family firm over the sample period are absorbed by the fixed effects. The Heckman selection model does not have this feature, which will provide more transparency into our analysis.

In order to control for selection bias in our sample, we will use Heckman two step model. Existence of unobservable private information is an important assumption for this model, in contrast to matching by propensity score, which assumes no private information and that the observable variables explain selection decisions. Self-selection may be presented as an omitted variable problem where the omitted variable is interpreted as a proxy for unobserved private information. By including the omitted self-selection variable, we control for and tests for the significance of private information in explaining ex-post outcomes of corporate choices (Prabhala & Li, 2007).

Step one in this methodology is to estimate a probit model, which estimates the selection mechanism. This is used to compute the inverse Mills ratio, the omitted

variable which represent the private information influencing firm decisions. Thereafter, in step two, we estimate the regression model for the selected sample by using the inverse Mills ratio to correct for the fact that we are dealing with a selected sub-sample. This procedure will return unbiased estimates of the coefficients corrected for self-selection.

The two step Heckman model is constructed to correct for bias that arise when not observing the counterfactual outcomes in a sample. A common example is the study of wages for women. Of course, one can only have observations for women that work. This means that only women that work are included in the sample giving, biased estimates for all woman as a result of sample selection. However, in our case this picture is not that distinct.

First of all, the dependent variable is observed for both of the two groups, and the observation should not depend on which group a firm belong to. Also, the estimated value of the dependent variable is not what we are really interested in. Thus, the two step Heckman self-selection model does not give us the opportunity to observe the family firm dummy variables as in the pooled least square or the fixed effects models.

What we can do is to observe whether the estimated omitted variable in form of the inverse Mills ratio is significant, meaning that there are self-selection and signs of omitted variable bias resulting in endogeneity. We will use the different family firm dummy variables as selection variables to estimate the selection mechanism in the Heckman model. In order to have a sample where outliers do not make noise in the probit-function we will use the sample which is truncated on company size in the form of mean revenue. Lower- and upper bounds of NOK7.000.000 and NOK500.000.000, are set respectively.

Switching Regressions Model

While the Heckman model restricts the coefficients for two sub-samples to be the same in one regression, the switching regression model allows the two samples to have different coefficients and have one main regression for each. This is favorable since we observe both groups and not just the treated group. In our test, we will apply the full information maximum likelihood (FIML) estimation by using the "Movestay" command in Stata. The FIML method simultaneously estimates the probit criterion or selection equation and the regression equations to yield consistent standard errors (Lokshin & Sajaia, 2004).

In this methodology, the error term of the selection model and the error term of the two regression equations are of main interest. If the estimated covariance, sigma, between the error term for the selection equation and one of the regressions equations is statistically significantly different from zero, then the decision to be a specific type of family firm and the outcome variables are correlated, that is we find evidence of endogenous switching and reject the null hypothesis of absence of sample selectivity bias (Asfaw, 2010).

Further, it is interesting to interpret the estimated coefficient of correlation, rho, for the selection equation and the two main regression equations isolated. If rho is statistically significant there exist both observed and unobserved factors that influences the decision to be treated, which indicates that self-selection occurred (Asfaw, 2010; Kuntashula & Mungatana, 2013). Further, the sign of rho indicates the effect of the selection on the outcome variables (Lokshin & Sajaia, 2004).

Cohort Study

In addition to our main models and their respective robustness test on the main sample, we will present a cohort study on a sub-sample. A cohort exist of firms that are born in the same year. In this study the firms in the cohorts are observed over their first five years of existence or until they die. In other words, the cohort sample is not balanced which allow for survival analysis as well. We also believe that an unbalanced sample will serve the purpose of the study better than a balanced sample. In total we have gathered twelve cohorts in our sample, spanning from year 2000 to 2015, the first one being observed from 2000 to 2004, the second cohort from 2001 to 2005 and so on. The last cohort is observed from 2011 to 2015.

The main objective is to observe firms who share common defining characteristics in the same time span to make inference about development over time with respect to our main hypothesis-measures and survival probability. In this section of our study we will use a cohort sample which is relaxed with respect to mean revenue, lowering the limit in order to include small firms as well. Finally, we will run robustness tests in terms of propensity score matching, Heckman self-selection models and switching regressions models in order to provide results of strong quality. Since there is already imposed strong restrictions on the cohort sample, further truncation of the sample is not necessary.

6. Data

Our research is done on data provided by the Centre for Corporate Governance Research (CCGR) on both listed and unlisted Norwegian firms.

The CCGR data consists of seven tables:

- Account_Data: Accounting data from 1994 to 2015.
- Consolidated_Account_Data: Consolidated accounting data for 1994 to 2015.
- Industry_Code: NACE industry codes for the companies from 1998 to 2015. A company can be member of more than one industry.
- Ownership_Control: Governance data from 2000 to 2015.
- Misc_1994: Misc. data from 1994 to 2015.
- Misc_2000: Misc. data from 2000 to 2015.
- Misc_2009: Misc. data from 2009 to 2015.

Data Variables

A complete list of extracted CCGR items is provided in appendix 1. Further we have extracted data regarding GDP (SSB, 2017), Norwegian Bank treasury rates (Norges-Bank, 2017), inflation (SSB, 2018) and NACE codes (Brønnøysundregistrene, 2017; SSB, 2008).

Data Filters

In order to explore the most accurate picture from the data, we will apply the following filters before running the regressions.

1. Include only non-listed firms with limited liability
2. Include only independent firms that are not part of business groups
3. Industry filtering, excluding:
   a. Non-profit organizations and public services
   b. Financial firms
   c. All firms with "0" or missing NACE code
4. Exclude all firms with at least one missing ownership/control variable:
   a. Largest family ownership
   b. Largest family has CEO
   c. CEO birth year
5. Exclude all firms with negative total assets
6. Exclude all firms with ultimate ownership of largest family >1 (100%)

7. Excluded all firms with average revenue less than 1.000.000
8. Exclude extreme outliers in return on assets and return on equity

We excluded all firms with average revenue less than 1.000.000 in the main data sample used to test the main hypothesis. Mostly to ensure that results are not driven by small firms with little economic importance (Che & Langli, 2015). Further, the accounting data is consolidated to avoid the difference between parent and subsidiaries. As an example, a holding company has no sales, but receive dividend payments. We find it critical to investigate the data set using consolidated data on the firms, because without them our information on sales, assets would be meaningless, this is also emphasized by Sraer and Thesmar (2007).

We exclude the whole firm, not just observation, if some of the observations are excluded due to filtering. This is to ensure that we have consistent firms in our sample, meaning that we have consistent observation for the firm during its lifetime. As a final filtering step, we excluded extreme outliers, 1 % percentile, in return on-assets and return on equity. By reasoning, the extreme outliers had unreasonably high impact on the whole sample mean, something we think is not justifiable.

In addition to imposing multiple filters, we have adjusted for inflation in all variables including NOK to mitigate time trend, trying to avoid spurious data. In 2008, all Norwegian firms changed to a new set of NACE-codes, which we have adjusted for by replacing the old NACE codes with the new NACE code in accordance with Statistics Norway (SSB, 2008).

One limitation in the sample is a result from the filter which only allows independent firms, thus it does not include business groups. When firm size gets large there is a higher probability for business groups and complex firm structures. Thus, some middle sized and large firms may not be observed in the sample because they are part of business groups.

Definition of Main Variables

Definition of performance – return on assets

Return on assets (ROA) measures the profitability for all contribution of capital (Bodie, Kane, & Marcus, 2014) and measure how well the management of the firm generate profit using the assets in operations of the firm (Penman, 2013). Return on equity (ROE) measures how much return investors get on their invested capital. We will not use it as a main performance measure due to the possibility of manipulation through earnings management (Penman, 2013). As ROE depends on financing

decisions in terms of capital structure and ROA does not, we focus on ROA as our main performance measure proceeding forward. ROA is defined,

$$ROA_{it} = \frac{Earnings_{it}}{Total\ Assets_{it}}$$

Where the measure ‹‹$Earnings_{it}$›› is defined as,

$$Earnings_{it} = \text{Netincome}_{it} + \text{Interest Expense}_{it}$$

Definition of risk – volatility in revenue

As a measure of risk, we will measure the volatility of revenue for the *i*th firm at time *t* by the coefficient of variation over four years of historic data.

$$Volatility\ in\ Revenue_{it} = \frac{Stdev.Revenue_{it_{-3},it_0}}{Mean\ Revenue_{it_{-3},it_0}}$$

Since revenue is not affected by firm decisions, costs and potentially number manipulation, it is considered to be a quite robust measure for risk which allows for more valid comparison of firms across types, age and industries. It is also beneficial to look at revenue since it is not dependent on financing decision such as capital structure for example, in contrast to other risk measures such as volatility in earnings and leverage.

Definition of the return to risk tradeoff

For the return to risk tradeoff we found motivation from previous studies on portfolio management by William F. Sharpe. He introduced the Sharpe-ratio, which asses how well a portfolio does by looking at mean portfolio return less the risk free rate of return considering the volatility in terms of standard deviation of the portfolio return (Sharpe, 1994).

In our research we are going to look at accounting numbers for non-listed firms and not assess different portfolios managed. Therefore, we are going to adopt the approach and asses the different firms by their return on assets excess the risk-free rate of return. For risk free rate of return, we use the Norwegian average annual 3-year T-bill rate during the sample period. We use the standard deviation of ROA as a proxy for volatility. Hence, introducing the return to risk ratio, combining performance and volatility as the main ratio for the return to risk tradeoff.

$$Return\ to\ Risk\ Ratio_{it} = \frac{ROA_{it} - TBill\ 3\ years_{\ t}}{Stdev\ ROA_{it_0,it_T}}$$

Definition of Control Variables

Industry variables

Since firms in different industries are different by nature, they behave differently in stages of economic cycles and maturity (Kumar, Rajan, & Zingales, 1999). In order to control for industry specific effects, we will categorize all firms into nine different industry groups, inspired by the methodology by Berzins, Bøhren and Rydland (2008) and Hamelin (2009). An overview of the industries and NACE codes are provided in appendix 6.

Firm Size

Small and large firms have different characteristics. We will control for these effects by using the natural logarithm of revenues in NOK as a proxy for firm size.

Asset Intensity

Since human capital is not recorded on the balance sheet we control for different asset compositions in the different firm types. We measure the asset intensity by the natural logarithm of total assets.

Firm Age

As for industry, size and asset intensity, the age of the companies and how mature they are will have influence the analysis. Thus, we will use the control variable company age to control for this.

Age of CEO

As mentioned, previous studies find a significant relationship between age of CEO and risk taking. Hence, we will use the variable age of CEO as a control variable. Earlier studies have found age of CEO to be significantly negatively correlated with risk taking and innovation (Stewart, Watson, Carland, & Carland, 1999). As CEOs of family firms age, they may naturally become less innovative and risk taking because they become more focused on succession issues and maintaining family wealth, thereby reducing their entrepreneurial behavior (Kellermanns, Eddleston, Barnett, & Pearson, 2008). Hence, it might be interesting to both control for, but also interpret the relationship between age of CEO and the associated risk.

Ownership concentration

Herfindahl index is calculated based on the ownership stakes in the company, 1 is 100% of the equity. The index estimates the ownership concentration in the firm. If the ownership concentration is lower, it means that the ownership is more dispersed

implying that the company has a more diversified financing base. Hence, reducing financial risk for the owners and the company in general. The Herfindahl index is defined

$$\text{Herfindahl Index} = \sum_{i=1}^{n} S_i^2$$

where S_i^2 is the percentage ownership of shareholder *i*.

The literature justifies the Herfindahl Index as an important measure of ownership concentration, which allows us to control for both risk and performance.

Number of owners

We include number owners with the largest ultimate ownership as a control variable. It may seem circular to include both Herfindahl index and number of owners, however, they have a relatively low correlation of -0,2867, so we choose to include it as a control variable as well.

Leverage

In financial theory, capital structure is often looked to when assessing the idiosyncratic risk of a company. According to Franco Modigliani and Merton Miller, total risk of the company´s assets, real and financial, must be equal to the financial claims against those assets (Koller, Goedhart, & Wessels, 2015, p. 157). Further, since debt payments have priority over cash flows to equity, adding leverage in the capital structure increases the risk to equity holders. Hence, increasing the required return to shareholders as compensation for the risk added. With this intuition in mind, using debt to total assets as a proxy for risk preference in this study is reasonable. The variable Leverage is defined

$$Leverage_{it} = \frac{Total\ Debt_{it}}{Total\ Assets_{it}}$$

Including leverage allow us to control for the leverage effect, which might indicate how capital structure can affect performance and risk as a higher level of capital structure may create more financial distress and risk of bankruptcy.

Tangibility

We include tangibility as a control variable inspired by Frank and Goyal (2009), who states that companies with higher tangibility tend to have higher leverage. The ratio is defined as

$$Tangibility_{it} = \frac{Tangible\ Assets_{it}}{Total\ Assets_{it}}$$

A higher tangibility is assumed to make it easier to get debt financing, in contrast to a high fraction of intangible assets which are hard to value and liquidate. By including tangibility, we may control for the firm´s opportunities to grow and support higher revenues.

Growth in GDP

To capture some of the systematic risk from the business cycle we use growth in GDP as a control variable. If an industry is positively correlated with growth in GDP, the more positive correlation, the more systematic risk the industry is prone to inhabit. This control variable will serve as a fixed year effect in our models.

7. Main Results

Descriptive statistics

In table 1, a summary of descriptive statistics for the main sample is presented and include mean, median, standard deviation and number of observations for the different firm types with respect to the main variables. The last section presents the cumulative statistics for the whole sample. In appendix 4, the statistics are presented at for each year as well.

Performance

The sample mean ROA is largest for the entrepreneurial family firms and the single owner family firms, both with 9,1%. They are followed by the classical family firms with family CEO with 8,7%, non-family firms with a mean ROA of 7,3 % and lastly the classical family firms without family CEO with mean ROA of 5,5%. So, it seems that most of the family firms tend to have higher ROA than the control group. A graphical representation of the mean ROA for the different firm types for the whole sample period is provided in figure 1, and the development during the period for all firms in figure 2.

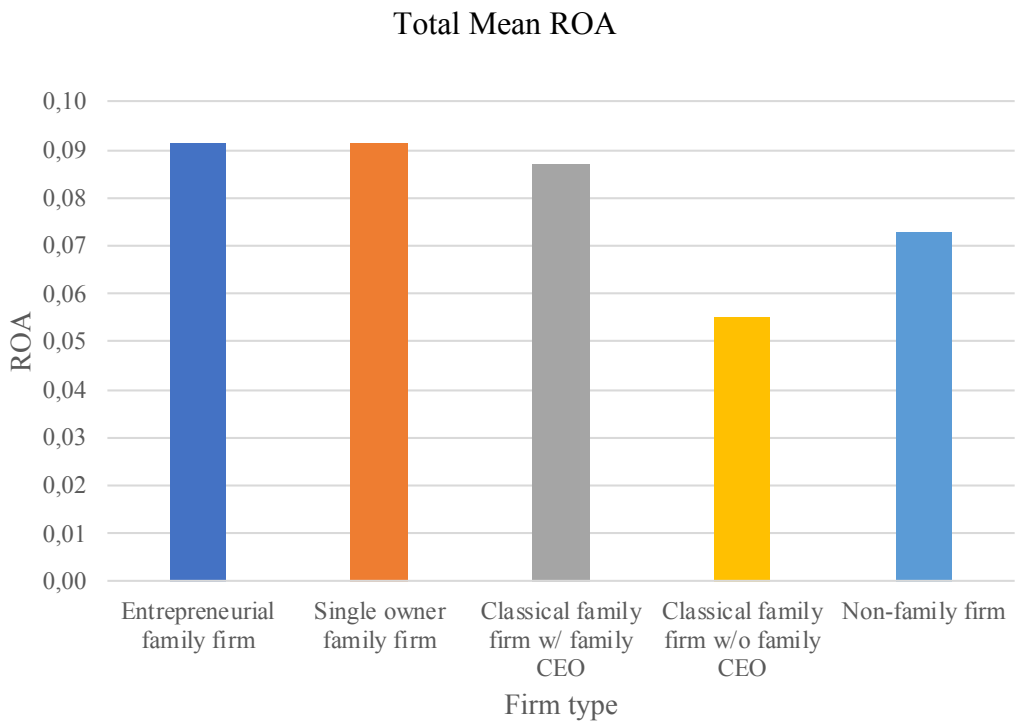


Figure 1: The figure presents the mean ROA in percent for the different firm types for the full sample period. Ranked from best to worst: (1) entrepreneurial family firms and single owner family firms, (2) classical family firms with family CEO, (3) non-family firms and (4) classical family firms without family CEO.

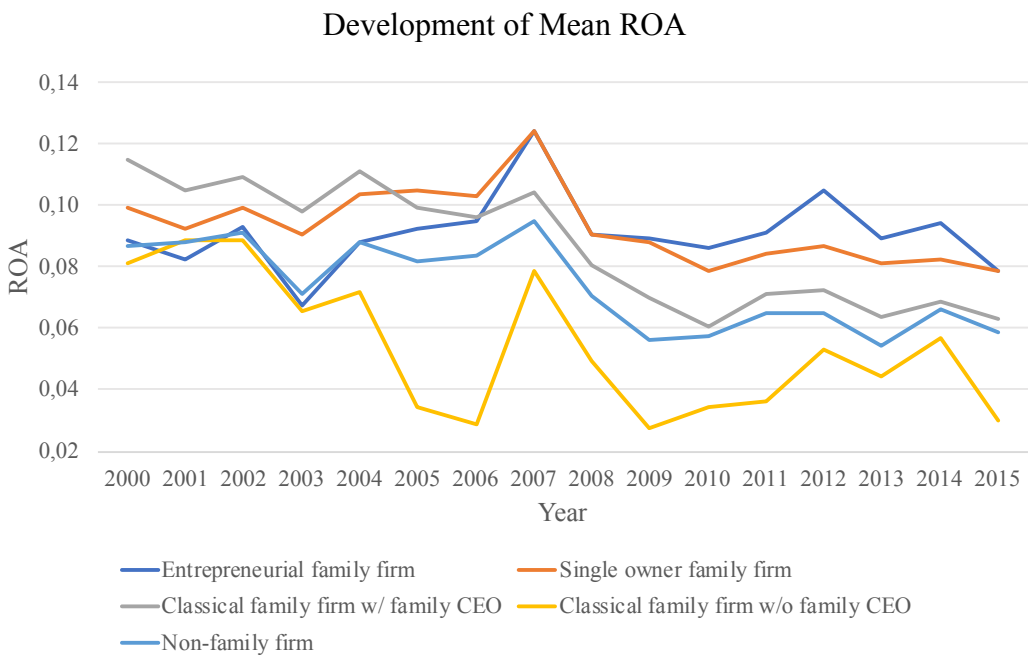


Figure 2: The graphs represent mean ROA in percent for the different firm types during the sample period from 2000 to 2015.

Risk

The volatility in revenue for the firms in the sample seems to be highest for the entrepreneurial family firms companied by the control group with a ratio of 0,265. Classical family firms with family CEO has the lowest ratio of 0,239. A graphical representation of the mean volatility in revenue for the different firm types for the whole sample period is provided in figure 3, and the development during the period for all firms in figure 4.

When it comes to leverage, the classical family firms without family CEO tend to debt finance investments to greatest extent with a mean ratio of 0,323. The control group comes second with a leverage ratio of 0,304. The single owner family firms seem to be the group that debt finance to least extent compared to the other sample groups with a mean of 0,244.

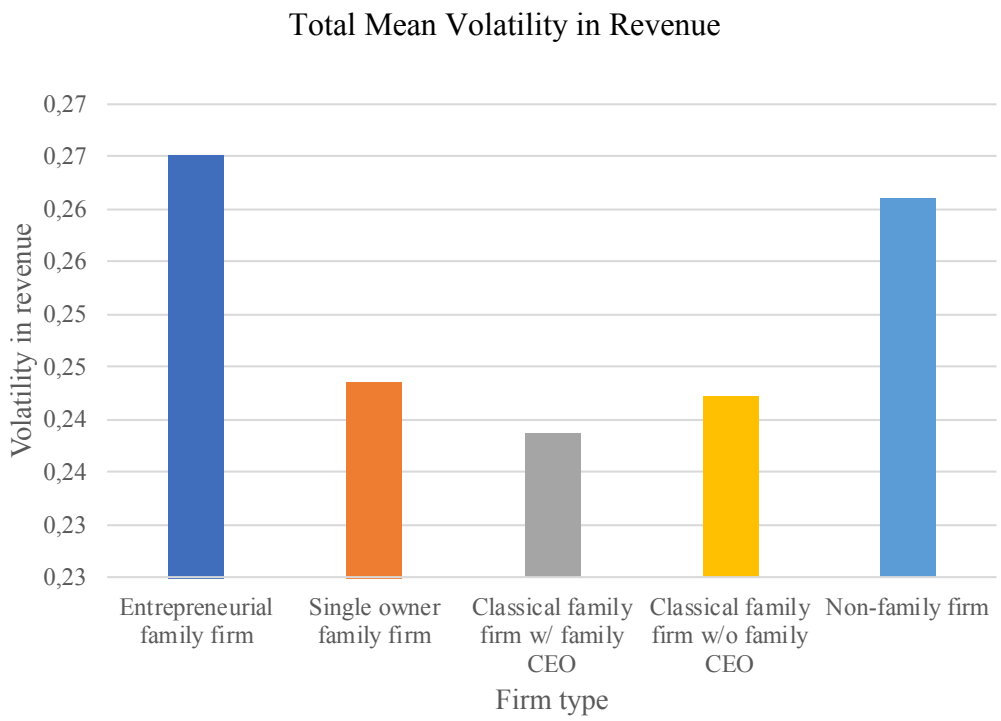


Figure 3: The figure presents the mean volatility in revenue for the different firm types for the full sample period. Ranked from best to worst: (1) classical family firms with family CEO, (2) classical family firms without family CEO, (3) single owner family firms, (4) non-family firms and (5) entrepreneurial family firms.

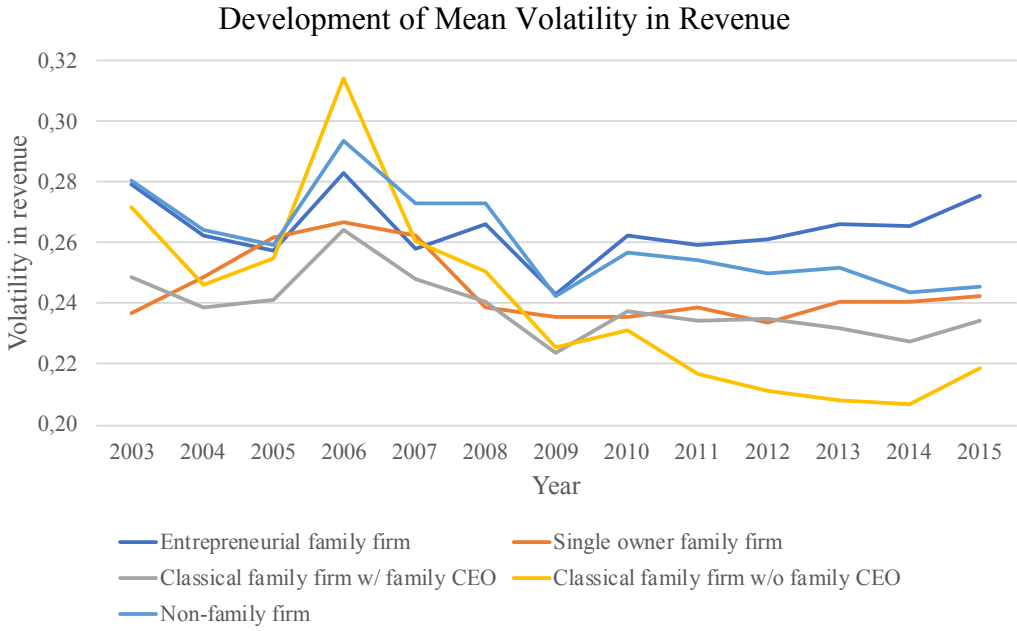


Figure 4: The graphs represent mean volatility in revenue for the different firm types during the sample period from 2000 to 2015.

Return to risk tradeoff

By the descriptive statistics, entrepreneurial family firms seem to be compensated the most for risk, assessed by the return to risk ratio with a mean of 0,874. The classical family firms without family CEO seem to be the least compensated for

risk. A graphical representation of the mean return to risk ratio for the different firm types for the whole sample period is provided in figure 5, and the development during the period for all firms in figure 6.

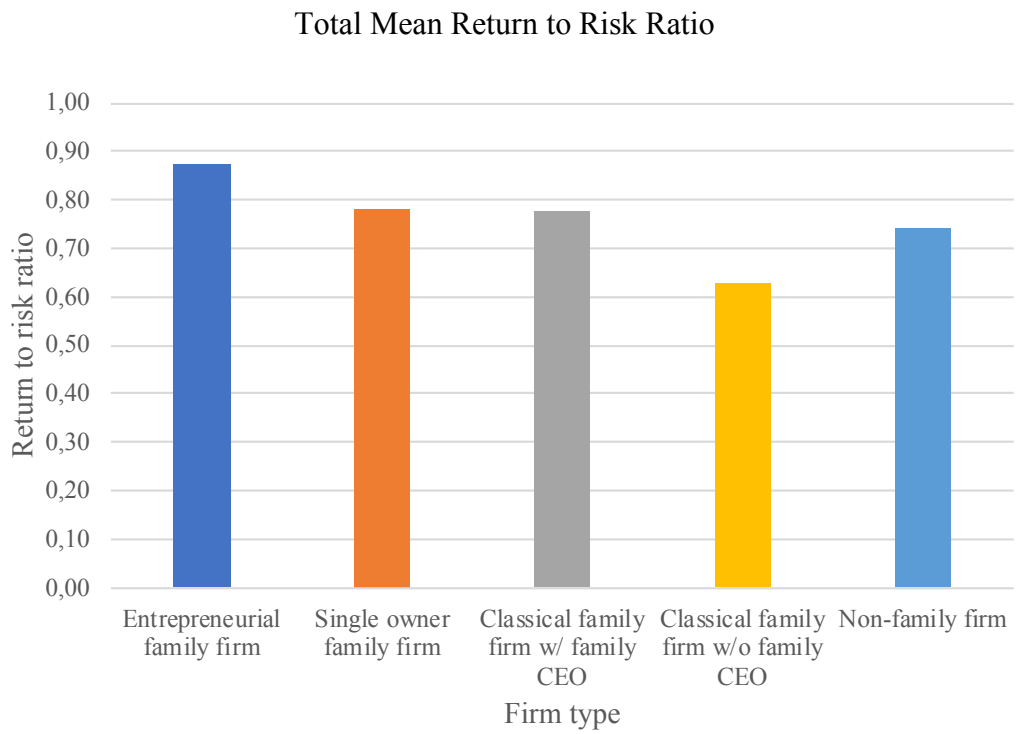


Figure 5: The figure presents the mean return to risk ratio for the different company types for the full sample period. Ranked from best to worst: (1) entrepreneurial family firms, (2) single owner family firms, (3) classical family firms with family CEO, (4) non-family firms and (5) classical family firms without family CEO.

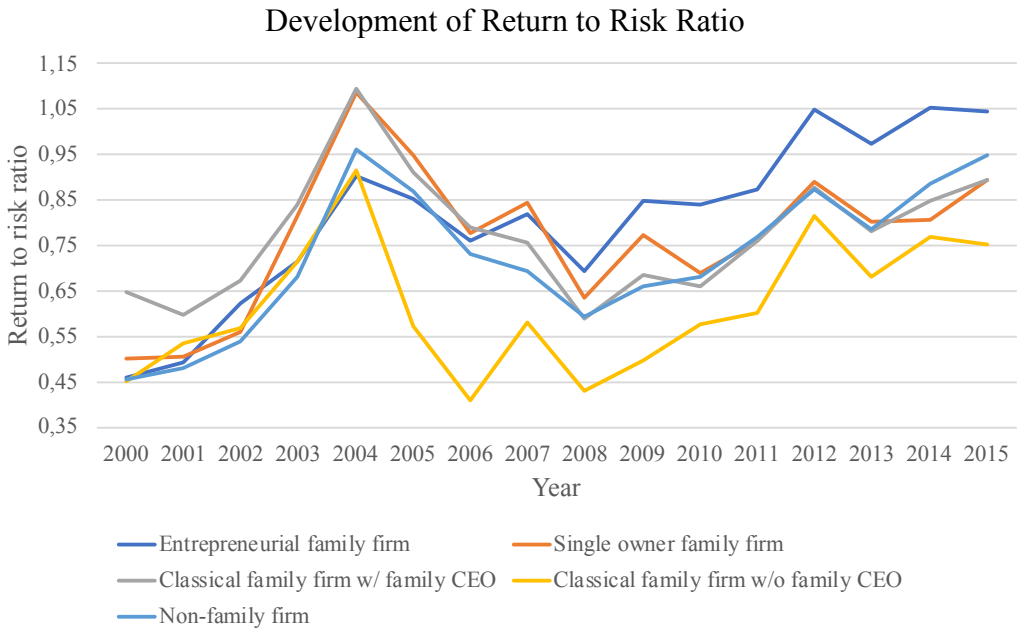


Figure 6: The graphs represent mean return to risk ratio for the different firm types during the sample period from 2000 to 2015.

Based on descriptive statistics, it is formed a view that the entrepreneurial family firms are associated with the most risk and appears to perform best in terms of ROA. Thus, it looks like the return to risk tradeoff holds as it may seem that the entrepreneurial family firms are associated with the highest return to risk ratio as well. However, this is purely observations without any statistically significance.

Discussion of descriptive statistics

In some of the firm characteristics the observed statistics are quite different for the firm types. Some of the values are as one might expect but others are somewhat surprising. Therefore, it will be interesting to observe how these differences emerge in the analysis.

On average, the entrepreneurial family firms are the smallest in terms of firm size, followed by the single owner family firms. The non-family firms are on average the largest with respect to company size.

Non-family firms have a mean of 4,92 owners with a Herfindahl-index rate of 0,38. Hence, the control group of non-family firms is the sample group with highest mean of owners and most dispersed equity financing base. In contrast to the entrepreneurial family- and single owner family firms with a Herfindahl-index rate of 1 and 1 owner. Within the family firms, it seems that family firms with family CEO has the most dispersed equity financing base with a Herfindahl-index rate of 0,49 and a mean of 2,78 owners.

Not surprisingly are the entrepreneurial family firms the group with the lowest mean firm age of 3,88, in contrast to the single owner family firms with a mean of 18,91. Keep in mind that both firm types are imposed to age restrictions. Both of the classical family firm types have a mean company age close to 11 years and the non-family firms close to 9 years.

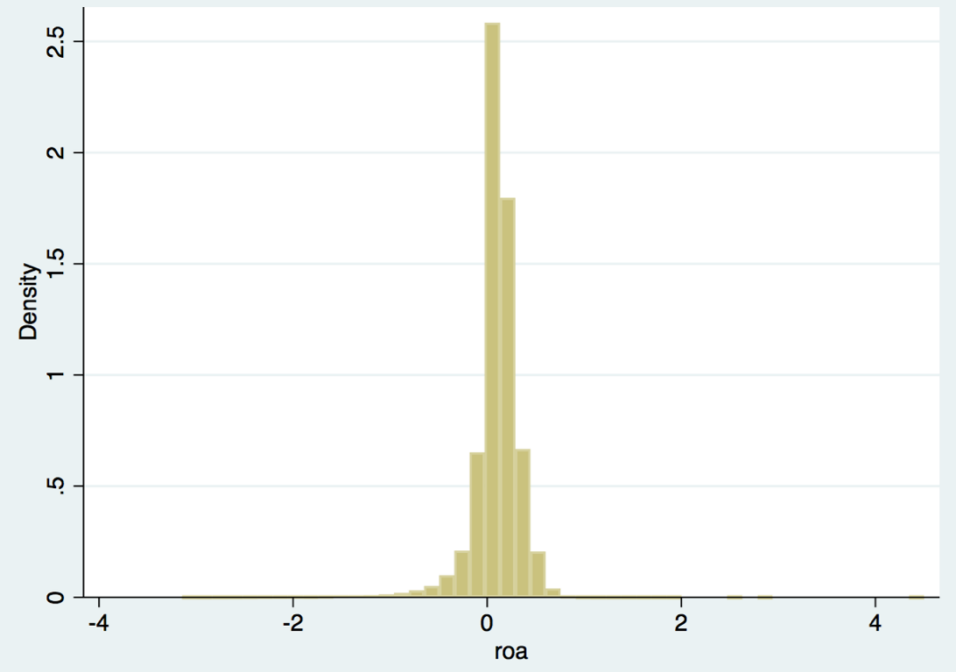
As a short digression, it is surprising to observe that the assumption that entrepreneurs are young graduates or adventurous people without education who start technology companies are not always applicable. We observe that mean age of CEO for the entrepreneurial family firms is around 45 years and that the startups are quite diversified in the industries. Appendix 7 provides overview of the distribution of firms with respect to industries. For the single owner family firms, mean age of CEO is the highest being 53,42 years. The classical family firms with family CEO have a mean age of CEO of 49. Lastly, the classical family firms without family CEO and the non-family firms have a mean age of CEO within 46

years. Complete year by year descriptive statistics on the sample is provided in appendix 4.

Entrepreneurial Skewness on ROA

In the main sample, the distribution of ROA for the entrepreneurial family firms in Norway is negatively skewed. This further motivates us to investigate more thoroughly whether the entrepreneurial family firms on average are less profitable and if they have a worse return to risk tradeoff than the rest of the firm types. This will also be addressed more carefully in the cohort study which dedicates more narrow focus on the entrepreneurial family firms.

Distribution of ROA for Entrepreneurial Family Firms



	Observations	Mean	Median	St.deviation	Skewness
ROA	99466	0,091	0,103	0,252	-2,944

Figure 7: Histogram of the distrubion of ROA for the entrepreneurial family firms in the main data sample.

Descriptive Statistics of the Main Sample

Firm type	roa	revenue	net income	volatilty revenue	leverage	return to risk ratio	number of owners	herfindahl	equity	total assets	tangibility	asset intensity	total debt	company age	age ceo	company size
Entrepreneurial family firm																
mean	0,091	6 765 983	282 471	0,265	0,285	0,874	1,00	1,00	835 107	2 809 767	0,191	14,297	935 300	4,021	45,384	15,039
median	0,103	2 932 996	133 848	0,174	0,174	0,672	1,00	1,00	375 945	1 563 625	0,093	14,263	223 716	3,000	45,000	14,912
standard deviation	0,252	12 700 000	851 494	0,289	0,400	1,568	0,00	0,00	2 145 460	4 338 761	0,234	1,034	2 420 533	2,911	9,836	1,112
observations	99 446	99 446	99 446	44 729	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	97 644
Single owner family firm																
mean	0,0915	8 512 693	392 413	0,244	0,245	0,783	1,00	1,00	1 691 717	4 514 507	0,197	14,737	1 260 958	18,866	53,420	15,258
median	0,090	3 848 370	175 938	0,139	0,148	0,631	1,00	1,00	728 664	2 468 599	0,096	14,719	304 590	16,000	54,000	15,212
standard deviation	0,174	15 100 000	983 130	0,320	0,363	1,388	0,00	0,00	3 703 752	7 282 880	0,241	1,068	3 587 367	9,219	9,145	1,239
observations	42 000	42 000	42 000	34 442	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	40 520
Classical family firm with family CEO																
mean	0,087	9 132 364	448 849	0,239	0,289	0,778	2,78	0,49	1 761 255	5 340 753	0,214	14,766	1 702 855	10,956	49,059	15,404
median	0,089	4 623 088	172 672	0,146	0,199	0,599	2,00	0,50	596 032	2 505 141	0,114	14,734	444 880	8,000	49,000	15,383
standard deviation	0,200	18 400 000	1 757 537	0,295	0,505	1,452	2,32	0,14	13 600 000	22 600 000	0,244	1,121	6 164 535	10,730	11,038	1,152
observations	128 513	128 513	128 513	77 942	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	125 236
Classical family fiirm without family CEO																
mean	0,055	12 400 000	535 923	0,242	0,323	0,627	2,42	0,64	3 044 753	7 902 253	0,196	14,778	2 207 750	10,789	46,668	15,557
median	0,079	5 196 135	140 940	0,145	0,226	0,452	2,00	0,55	501 795	2 464 192	0,090	14,717	504 825	8,000	46,000	15,510
standard deviation	0,269	29 200 000	8 705 506	0,300	0,378	1,525	2,42	0,28	37 600 000	45 500 000	0,241	1,279	11 100 000	10,803	12,164	1,262
observations	19 313	19 313	19 313	10 834	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	18 718
Non-family firm																
mean	0,073	12 500 000	505 288	0,261	0,304	0,741	4,92	0,38	2 210 256	7 728 354	0,185	14,876	2 886 665	8,975	46,614	15,588
median	0,084	5 387 672	163 816	0,161	0,212	0,550	3,00	0,36	612 600	2 687 504	0,073	14,804	506 150	6,000	46,000	15,549
standard deviation	0,234	37 300 000	5 850 178	0,313	0,354	1,521	11,48	0,15	14 100 000	34 300 000	0,243	1,261	20 200 000	9,575	10,295	1,211
observations	117 334	117 334	117 334	64 606	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	113 665
Full sample																
mean	0,083	9 610 662	422 750	0,251	0,290	0,784	2,76	0,64	1 718 090	5 447 043	0,197	14,681	1 835 077	9,497	47,791	15,359
median	0,090	4 216 511	158 556	0,154	0,193	0,599	2,00	0,52	540 828	2 254 136	0,093	14,628	383 267	7,000	47,000	15,292
standard deviation	0,225	24 800 000	3 838 849	0,303	0,420	1,500	6,51	0,30	13 600 000	24 800 000	0,241	1,167	11 800 000	9,822	10,681	1,193
observations	406 606	406 606	406 606	232 553	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	395 783

Table 1: The table provides descriptive statistics of the main sample used for the main regression model. The different types of family firms are presented vertically and the variables horizontally. For the variables revenue, net income, equity, total assets and total debt are presented in monetary values denominated in NOK.

Concentration of firms in the sample

Table 2 presents the distribution of the different firm types year by year as well as the total observations during the sample period. The observations amount to a grand total of 406.606. The largest group observed is the classical family firms with family CEO followed by the control group. Note that the family firms without family CEO is the second largest group with respect to mean firm size in table 1, however, it is the smallest group with respect to observations in the main sample. The distribution on observations for the different firm types is quite uneven.

Firm Observations in the Main Sample

Year	Entrepreneurial family firm	Single owner family firm	Classical family firm w/ family ceo	Classical family firm w/o family ceo	Non-family firm
2000	3 076	1 555	7 332	1 072	4 857
2001	3 159	1 940	7 969	1 193	5 102
2002	2 965	2 249	8 077	1 234	5 237
2003	4 093	2 463	9 710	1 903	7 167
2004	3 984	2 563	9 515	1 550	7 081
2005	4 037	2 205	8 539	1 390	7 748
2006	3 912	2 180	5 675	1 124	9 820
2007	5 686	2 378	8 308	1 032	7 534
2008	6 392	2 553	8 266	1 070	7 576
2009	6 628	2 822	8 161	1 071	7 623
2010	7 270	2 892	8 141	1 131	7 759
2011	7 915	3 077	8 171	1 148	7 827
2012	9 167	3 142	7 995	1 215	8 436
2013	10 495	3 339	8 090	1 162	8 511
2014	10 945	3 288	7 589	996	7 932
2015	9 722	3 354	6 975	1 022	7 124
Total	99 446	42 000	128 513	19 313	117 334

Table 2: The table presents the number of observations within the different firm types for each year during the sample period.

Further, in table 3, we observe how many new firms that are introduced to the sample during the sample period. There are relatively many firms recorded in 2000 because all firms prior to that year and newly established firms are entering the sample at the same time. Hence, we exclude year 2000 in the table. From 2001 to 2015, only new-born firms are accounted for. Due to some registration error in the data set during 2002, the number of firms might be artificially low.

Yearly Count of New Firm Entries

Year	Entrepreneurial family firm	Single owner family firm	Classical family firm w/ family CEO	Classical family firm w/o family CEO	Non-family firm
2001	297	110	470	117	490
2002	44	48	153	33	177
2003	1 363	76	1 821	346	2 113
2004	363	41	442	84	638
2005	1 002	30	1 009	171	1 368
2006	495	15	255	46	651
2007	2 186	52	1 185	185	1 608
2008	1 227	24	632	89	907
2009	985	24	574	101	863
2010	1 185	30	602	128	1 037
2011	1 239	23	599	112	896
2012	2 269	17	777	158	1 214
2013	2 160	19	662	130	967
2014	1 890	17	642	98	988
2015	83	3	35	8	52
Total	16 788	529	9 858	1 806	13 969

Table 3: The table presents the number of new entries for the different firm types for the different years during the sample period. Year 2000 is excluded as firms established prior to 2000 and the newly established firms in 2000 are reported in the same number.

Concentration of firms within the industries

Table 4 presents the distribution of firms with respect to the industries. As we want to control for the industry effects, we see that there are some industries which are more dominating than others in the sample period, such as TRAD, consisting of mostly wholesale, SERV, consisting of the service sector and ICOR, consisting of the infrastructure, construction and operation of real estate. In appendix 6 a complete description of the industries with respective abbreviations is provided.

ENGY, consisting of extraction of oil and natural gas as well as electricity, steam and hot water supply, has relatively few representatives in the sample.

HEDU is consisting of education and health services and is fairly well represented in the sample. This industry might have more regulations and other motives, such as absence of profit maximization, than the other sectors due to more public stakeholders. On might argue that they should not have been included in the sample due to these implications, however, as Bøhren and Berzins (2008) we chose to include them but rather categorized as an individual industry than including them in the service industry.

Further, AFFM consists of agriculture, forestry, fishing and mining. MACH consists of manufacturing and business involved in making or handling chemical products. LOGI consists of logistics. For more detailed information on the composition of the different firm types in each of the different industries, see appendix 7.

The correlation matrix for the industries and growth in GDP is provided in appendix 5. AFFM, MACH and TRAD seem to be pro-cyclical and might be prone to more systematic risk. The other industries seem to be countercyclical.

Representation of Firms Within the Industries

Year	AFFM	MACH	ENGY	ICOR	LOGI	TRAD	SERV	HEDU	CULT
2000	642	2 098	10	3 627	829	6 203	3 804	584	95
2001	705	2 243	11	3 929	896	6 693	4 148	639	99
2002	718	2 304	13	3 985	918	6 811	4 262	648	103
2003	970	2 734	29	5 199	1 166	8 507	5 720	868	143
2004	966	2 680	32	5 164	1 118	8 202	5 515	864	152
2005	1 004	2 514	46	5 102	1 086	7 646	5 426	925	170
2006	982	2 288	53	4 954	1 039	7 013	5 246	968	168
2007	1 135	2 187	67	5 723	1 170	7 256	6 007	1 201	192
2008	1 199	2 127	75	6 132	1 232	7 278	6 302	1 303	209
2009	635	2 004	82	6 225	1 270	7 228	7 199	1 383	279
2010	642	1 970	89	6 515	1 299	7 341	7 592	1 432	313
2011	685	1 945	87	6 876	1 370	7 463	7 891	1 501	320
2012	659	1 963	96	7 474	1 466	7 545	8 682	1 697	373
2013	692	1 959	98	7 929	1 590	7 736	9 311	1 871	411
2014	678	1 870	93	7 843	1 574	7 298	9 075	1 909	410
2015	632	1 711	77	7 226	1 469	6 739	8 229	1 742	372
Total	12 944	34 597	958	93 903	19 492	116 959	104 409	19 535	3 809

Table 4: The table presents number of observations of firms categorized in the different industries for the different years during the sample period. AFFM =Agriculture, forestry, fishing and mining, MACH = Manufacturing and chemical products, ENGY = Energy, ICOR = Infrastructure, construction and operations in real estate, LOGI = Logistics, TRAD = Trade, SERV = service, HEDU = Health services and education, Culture = CULT.

Main Regressions

This section presents the results from the main models of this thesis, divided in three segments of hypotheses regarding performance, risk and the return to risk ration, respectively. For every hypothesis, both pooled least squares and fixed effects methodology is executed. The test statistics for every model´s respective Hausman test indicates that the fixed effects model is the appropriate approach.

First, we repeat the purpose of the model and its hypothesis followed by a description of the main results and discussion relating the findings to previous literature and theory. The related tables of regression outputs are presented in the end of each segment.

Performance

In the first segment of hypotheses, we investigate the relationship between performance, measured by ROA, and being a family firm. In addition to the dimension of family versus non-family firms, we look at how the different types of family firms perform compared to each other and how the effect of having a CEO from the family firm with the largest ultimate ownership are associated with performance.

Hypothesis H1A

Question: Are family firms associated with higher performance, in terms of return on assets, than non-family firms?

> **H0:** Family firms are not associated with a higher performance than non-family firms
>
> **HA:** Family firms are associated with a higher performance than non-family firms

For the first hypothesis, H1A, we look at the general distinction between family and non-family firms and their relationship to ROA. In table 5, we observe this relationship and indeed we find support to the alternative hypothesis by rejecting the null hypothesis. In both regression models, we observe positively statistically significant coefficients for the dummy variable, family firm, on the 1% level.

In the pooled least squares model, we observe firms that are family firms. The result suggests that being a family firm is positively associated with performance. The independent variables, except the industry variables, are significant. Age CEO is significant on the 5% level, and the other variables on the 1% level.

Arguably, family firms are associated with higher ownership concentrations, as we observed non-family firms to have on average 4,92 owners with the lowest Herfindahl-index rate of 0,38 in the descriptive statistics. The results from the pooled least squares model suggest that the Herfindahl index is significantly positively related to firm performance, at the 1% level. This contradicts existing literature by Fama and Jensen (1983) and Pound (1988), which argued that high concentration of ownership in hands of one entity may adversely affect the performance. However, our results are in consensus with previous findings by Berzins, Bøhren and Rydland (2008) that also suggest that the ROA is higher when personal ownership is high.

In the fixed effects model, we observe the effect of becoming a family firm. We do not observe firms that remain in one category. The results suggest that becoming a family firm is positively associated with performance. In this model we observe that the variables ‹‹number of owners›› and ‹‹Herfindahl index›› are not significant. This is plausibly explained by the properties of the fixed effects model where time invariant effects are absorbed by the fixed effects. This property may also be the reason why the age of CEO is also not significant. The rest of the independent variables are significant on the 1% level.

The results from the models support previous consenting literature by Sraer and Thesmar (2007), Anderson and Reeb (2003), Amit and Villalonga (2006), Perez-González (2006) and Jaskiewicz and Klein (2005), who find that family firms outperform non-family firms.

Hypothesis H1B1

Question: Are family firms with CEO from the family with the largest ultimate ownership associated with higher performance than the firms with a non-family CEO?

> **H0:** Firms with family CEO are not associated with higher performance than firms without family CEO
>
> **HA:** Firms with family CEO are associated with higher performance than firms without family CEO

Under hypothesis H1B1, we will go deeper by looking at the effect of having a CEO from the family with the largest ultimate ownership in the firm. In table 6, we observe this relationship, and indeed we find support for the alternative hypothesis

by rejecting the null hypothesis. In both of the regressions, the coefficient for family CEO is positively statistically significant on the 1% level.

In the pooled least squares model, we observe firms that have family CEO in parts of the period or over the whole sample period. The result suggests that having a CEO from the family with the largest ultimate ownership is positively associated with performance. The independent variables, except the industry variables, are significant. The Herfindahl index is significant on the 5% level, and the other variables on the1% level.

In the fixed effects model, the results suggest that changing to have a CEO from the family with largest ultimate ownership is positively associated with performance. The independent variables are significant, except for number of owners and age of CEO.

The results from these tests are in line with the previous literature supporting that firms with a CEO from the family with the largest ultimate ownership are outperforming those who have not. What may cause this relationship may be explained by agency theory (Jensen & Meckling, 1976; Shleifer & Vishny, 1997; Villalonga & Amit, 2006). In line with predictions from agency theory, the results may be due to mitigation of agency cost. The agent may share goal and incentives that are aligned with the family as ultimate owner, as they share higher economic upside associated with firm success than other non-family CEOs. This might imply that the family CEO is more prone to have absence of short-termism (Cadbury, 2000) or the CEO might have ‹‹harder-to-obtain›› firm specific knowledge with higher level of trust from key stakeholders.

These results are however contradicting to the theory of stewardship (Corbetta & Salvato, 2004; Davis et al., 1997), saying that the family CEO, as a result of serving as a steward for the owners, make sub-optimal decisions associated with lower performance.

Hypothesis H1B2

Question: Are family firms with CEO from the family with the largest ultimate ownership associated with higher performance than the firms with a non-family CEO?

> **H0:** Firms with family CEO are not associated with higher performance than firms without family CEO

HA: Firms with family CEO are associated with higher performance than firms without family CEO

Under hypothesis H1B2, we seek to look more closely at the different types of family firms with family CEO; entrepreneurial family firms, single owner family firm and classical family firms with family CEO, and their relationship with ROA. In table 7, we once more observe that all the family variables are positively statistically significant on the 1% level.

What is interesting to observe is that both the entrepreneurial family firms and the single owner family firms are associated with a higher performance in terms of ROA than the classical family firms with family CEO. This result is contradicting existing literature stating that the entrepreneurial firms more often perform worse (Hvide & Panos, 2014).

In the pooled least squares model, we observe firms that are one of the three firm types, entrepreneurial family firms, single owner family firm or classical family firms with family CEO, in parts of the period or over the whole sample period. The findings suggest that being one of the family firm types is positively associated with performance, single owner family firms being the strongest performers followed by the entrepreneurial family firms and the classical family firms with family CEO. The independent variables, except the industry variables and the Herfindahl index, are significant on the 1% level.

In the fixed effects model, the results suggest that becoming either one of the firm types is positively associated with performance relative to the firms without family CEO. The other independent variables, except the Herfindahl index, age of CEO and the industry variables, are statistically significant on the 1% level.

To summarize the first segment of models, we find support for our hypotheses, but with one exception. Our findings support previous literature that family firms outperform non-family firms, and in that firms with family CEO outperform those without family CEO. However, the interesting finding, contradicting previous literature and therefore a new contribution, is that the entrepreneurial family firms and the single owner family firms are associated with higher performance than the classical family firms.

H1A

Dependent variable: ROA		**PLS**	**Fixed Effects**
Family variable	family firm	0,0039***	0,0082***
		(0,0014)	(0,0023)
Control variables	company size_1	-0,0047***	0,0214***
		(0,0008)	(0,0014)
	volatility in revenue	-0,0678***	-0,0232***
		(0,0030)	(0,0035)
	leverage_1	-0,0537***	0,1349***
		(0,0039)	(0,0072)
	herfindahl index	0,0089***	-0,0077
		(0,0022)	(0,0050)
	number of owners	-0,0011***	-0,0000
		(0,0001)	(0,0001)
	asset intensity_1	0,0261***	-0,0503***
		(0,0009)	(0,0021)
	company age	-0,0005***	-0,0031***
		(0,0001)	(0,0002)
	tangibility	-0,0850***	-0,1633***
		(0,0032)	(0,0105)
	age ceo	-0,0001**	-0,0002
		(0,0001)	(0,0001)
Year effect	growth in GDP	0,6845***	0,3638***
		(0,0209)	(0,0190)
Industry	AFFM	0,0052	
		(0,0080)	
	MACH	-0,0030	
		(0,0076)	
	ENGY	0,0308***	
		(0,0108)	
	ICOR	0,0097	
		(0,0075)	
	LOGI	0,0067	
		(0,0077)	
	TRAD	-0,0143*	
		(0,0076)	
	SERV	0,0262***	
		(0,0076)	
	HEDU	0,0647***	
		(0,0081)	
	constant	-0,1970***	0,5389***
		(0,0121)	(0,0269)
	Number of observations	229 076	229 076
	Clusters (firms)	43 388	43 388
	P-value	0,0000	0,0000
	R-squared	0,0486	
	R-squared within		0,0525
	R-squared overall		0,0018
	Rho		0,6740
	Hausman P-value		0,0000

Table 5: The dependent variable as a measure of performance is ROA, defined under variables. The independent variable of interest is "family firm". We include the control variables company size lagged one year, volatility in revenue, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

H1B1 Dependent variable: ROA		PLS	Fixed Effects
Family variable	family ceo	0,0102***	0,0128***
		(0,0013)	(0,0021)
Control variables	company size_1	-0,0044***	0,0215***
		(0,0008)	(0,0014)
	volatility in revenue	-0,0674***	-0,0231***
		(0,0030)	(0,0035)
	leverage_1	-0,0534***	0,1349***
		(0,0039)	(0,0072)
	herfindahl index	0,0040*	-0,0102**
		(0,0022)	(0,0050)
	number of owners	-0,0010***	-0,0001
		(0,0001)	(0,0001)
	asset intensity_1	0,0260***	-0,0503***
		(0,0009)	(0,0021)
	company age	-0,0005***	-0,0031***
		(0,0001)	(0,0002)
	tangibility	-0,0856***	-0,1635***
		(0,0032)	(0,0105)
	age ceo	-0,0002***	-0,0002
		(0,0001)	(0,0001)
Year effect	growth in GDP	0,6874***	0,3668***
		(0,0209)	(0,0189)
Industry	AFFM	0,0044	
		(0,0080)	
	MACH	-0,0036	
		(0,0076)	
	ENGY	0,0319***	
		(0,0108)	
	ICOR	0,0090	
		(0,0075)	
	LOGI	0,0059	
		(0,0077)	
	TRAD	-0,0151**	
		(0,0076)	
	SERV	0,026***	
		(0,0076)	
	HEDU	0,0642***	
		(0,0081)	
	constant	-0,1990***	0,5375***
		(0,0121)	(0,0267)
	Number of observations	229 076	229 076
	Clusters (firms)	43 388	43 388
	P-value	0,0000	0,0000
	R-squared	0,0489	
	R-squared within		0,0527
	R-squared overall		0,0018
	Rho		0,6738
	Hausman P-value		0,0000

Table 6: The dependent variable as a measure of performance is ROA. The independent variable of interest is "family CEO", which includes entrepreneurial family firms, single owner family firms and classical family firms with family CEO. We include the control variables company size lagged one year, volatility in revenue, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

H1B2 Dependent variable: ROA		PLS	Fixed Effects
Family variable	entrepreneurial family firm	0,0157***	0,0212***
		(0,0028)	(0,0049)
	single owner family firm	0,0173***	0,0212***
		(0,0028)	(0,0047)
	classical family firm with family ceo	0,0098***	0,0114***
		(0,0014)	(0,0021)
Control variables	company size_1	-0,0044***	0,0215***
		(0,0008)	(0,0014)
	volatility in revenue	-0,0675***	-0,0232***
		(0,0039)	(0,0035)
	leverage_1	-0,0534***	0,1349***
		(0,0039)	(0,0072)
	herfindahl index	-0,0052	-0,0234***
		(0,0040)	(0,0081)
	number of owners	-0,0011***	-0,0001
		(0,0001)	(0,0001)
	asset intensity_1	0,0259***	-0,0504***
		(0,0009)	(0,0021)
	company age	-0,0005***	-0,0031***
		(0,0001)	(0,0002)
	tangibility	-0,0854***	-0,1636***
		(0,0032)	(0,0105)
	age ceo	-0,0002***	-0,0002
		(0,0001)	(0,0001)
Year effect	growth in GDP	0,6887***	0,3669***
		(0,0209)	(0,0189)
Industry	AFFM	0,0047	
		(0,0080)	
	MACH	-0,0034	
		(0,0076)	
	ENGY	0,0314***	
		(0,0108)	
	ICOR	0,0092	
		(0,0075)	
	LOGI	0,0062	
		(0,0077)	
	TRAD	-0,0148*	
		(0,0076)	
	SERV	0,0261***	
		(0,0075)	
	HEDU	0,0643***	
		(0,0081)	
	constant	-0,1934***	0,5440***
		(0,0123)	(0,0271)
	Number of observations	229 076	229 076
	Clusters (firms)	43 388	43 388
	P-value	0,0000	0,0000
	R-squared	0,0490	
	R-squared within		0,0528
	R-squared overall		0,0017
	Rho		0,6738
	Hausman P-value		0,0000

Table 7: The dependent variable as a measure of performance is ROA. The independent variables of interest are "entrepreneurial family firm", "single owner family firm" and "classical family firm with family CEO". We include the control variables company size lagged one year, volatility in revenue, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

Risk

In the second segment of hypotheses, we investigate the relationship between risk, measured by the coefficient of variation in revenue over four years, and being family firms and the different types of family firms.

Hypothesis H2A

Question: Are family firms associated with lower risk than non-family firms?

H0: Family firms are not associated with less risk than non-family firms

HA: Family firms are associated with less risk than non-family firms

Under hypothesis H2A, we observe the relationship between risk and being a family firm. Again, we start by looking at the overall level before breaking it down further. In table 8, we observe a negative correlation between the dependent risk variable, and the dummy variable, family firm. In both models, the coefficient for the family firm variable is negatively statistically significantly different from zero at the 1% level. We therefore reject the null hypothesis.

In the pooled least squares regression, the findings suggest that being a family firm is associated with lower risk than non-family firms. The independent variables, except the industry variables and the Herfindahl index, are significant at the 1% level.

In the fixed effects model, the results suggest that becoming a family firm is negatively correlated with level of risk. The coefficient for leverage lagged one year and for number of owners are not statistically significantly different from zero, the Herfindahl index is significant at the 5% level. The other independent variables are statistically significant on the 1% level.

The findings indicate that family firms are associated with lower levels of risk than the non-family firms. This result is in line with the study by Naldi, Nordqvist, Sjöberg, and Wiklund (2007), suggesting that family firms engaged in entrepreneurial activities take on less risk than non-family firms.

Hypothesis H2B

Question: Are classical family firms with family CEO and single owner family firms are associated with less risk than entrepreneurial family firms and classical family firms with non-family CEO?

> **H0:** Classical family firms with family CEO and single owner family firms are not associated with less risk than entrepreneurial family firms and classical family-firms with non-family CEO
>
> **HA:** Classical family firms with family CEO and single owner family firms are not associated with less risk than entrepreneurial family firms and classical family-firms with non-family CEO

Under hypothesis H2B, we look more closely at how the different types of family firms are related to level of risk. Under this hypothesis the results from the fixed effects model were difficult to interpret and inconclusive. Thus, only the pooled least squares model is included and presented in table 9.

In the pooled least squares regression, all four family variables are negatively correlated with the dependent risk variable. However, the coefficient for classical family firms without family CEO is not statistically significant. The coefficient for entrepreneurial family firms is negatively statistically significant at the 5% level and the coefficient for single owner family firms and classical family firms with family CEO at the 1% level. These results support the hypothesis, suggesting that the family firms with family CEO and single owner family firms are associated with less risk than the other types of family firms. The Herfindahl index is statistically significant at the 5% level and the rest of the independent variables at the 1% level, except the industry variables.

From the descriptive statistics we observe that the average age of CEOs is highest for single owner family firms, followed by family firms with family CEO. As an additional inference we do find statistical significant evidence at the 1% level suggesting that age of CEO is negatively related to risk taking, supporting previous literature by Stewart, Watson, Carland and Carland (1999). As CEOs of family firms age, they may naturally become less innovative and risk taking because they become more focused on succession issues and maintaining family wealth, that may result in more strive to maintain steadier stream of income. The aforementioned might be possible reasons why the age of CEOs is indeed negatively related to risk.

The descriptive statistics shows that the single owner family firms and the classical family firms with family CEO have the highest mean company age. As risk is measured by volatility in revenue, the result may suggest that these firms have reached a more steadier state than the others. The regression result suggests that company age is associated with a lower level of risk.

In this second segment of models we find that family firms are associated with a lower level of risk than the non- family firms. Further, we also find support for the hypothesis that classical family firms with family CEO and single owner family firms indeed are associated with lower levels of risk than the entrepreneurial family firms and the family firms without family CEO.

These results support previous literature on multiple dimensions. Due to socioemotional dimensions, family firms may be reluctant to take on more risk than strictly necessary. They might be less diversified with respect to ownership structure and motivated to keep the control within the family. Non-family firms where management is more inclined to pursue risky strategies with short-term monetary gains in absence of long-term personal ownership gains, may be more motivated to take on more risk in order to succeed.

As reviewed in the literature, according to McConaughy Matthews and Fialko (2001), Mishra and McConaughy (1999), family members tend to have a high financial investment in the firm because their desire to maintain control might make them use little debt and choose low-risk capital structures as the financial burden of failure is more concentrated on the family members. In both of the pooled least squares models, the leverage is positively significant at the 1% level, indicating that a higher level of debt is associated with higher level of risk. As observed in the descriptive statistics, average leverage is lower for classical firm with family CEO, entrepreneurial family firms and single owner family firms than family firm without family CEO and non-family firms. Interestingly, this is the same relationship as in the result for risk association in the pooled least squares models. This might indicate that less risk is taken in firms where the financial burden of failure is more concentrated in the family firms that have a family CEO. Non-family CEOs might not have any ownership at all, resulting in absence of personal financial risk (Huybrechts, Voordeckers, & Lybaert, 2013).

An intriguing finding is regarding the single owner family firms. In the pooled least squares model, these firms are associated with a lower levels of risk than the

entrepreneurial family firms. This may be explained by the the fact that these firms firms be owned and managed by individuals that have a lot at stake personally but have been driving their business for more than ten years without going bankrupt, more likely being in a steady state. Also, the entrepreneurial family firms may still be in a state where they are more inclined to pursue risky strategies in order to succeed.

H2A

Dependent variable: volatility in revenue		PLS	Fixed Effects
Family variable	family firm	-0,0219***	-0,0078***
		(0,0021)	(0,0025)
Control variables	roa_1	-0,0601***	0,0274***
		(0,0045)	(0,0036)
	company size_1	-0,1207***	-0,1394***
		(0,0017)	(0,0024)
	leverage_1	0,0647***	0,0057
		(0,0031)	(0,0038)
	herfindahl index	0,0000	0,0120**
		(0,0034)	(0,0056)
	number of owners	0,0007***	-0,0000
		(0,0002)	(0,0001)
	asset intensity_1	0,0877***	0,0345***
		(0,0016)	(0,0024)
	company age	-0,0023***	-0,0025***
		(0,0001)	(0,0002)
	tangibility	-0,1060***	-0,0164***
		(0,0044)	(0,0056)
	age ceo	-0,0011***	-0,0007***
		(0,0001)	(0,0001)
Year effect	growth in GDP	0,3061***	0,1300***
		(0,0253)	(0,0206)
Industry	AFFM	0,0141	
		(0,0099)	
	MACH	0,0013	
		(0,0089)	
	ENGY	-0,0329*	
		(0,0178)	
	ICOR	0,0693***	
		(0,0088)	
	LOGI	0,0088	
		(0,009)	
	TRAD	-0,0106	
		(0,0087)	
	SERV	-0,0055	
		(0,0086)	
	HEDU	-0,0410***	
		(0,0093)	
	constant	0,8877***	1,9345***
		(0,0178)	(0,0356)
	Number of observations	229 076	229 076
	Clusters (firms)	43 388	43 388
	P-value	0,0000	0,0000
	R-squared	0,1922	
	R-squared within		0,1576
	R-squared overall		0,1174
	Rho		0,7373
	Hausman P-value		0,0000

Table 8: The dependent variable as a measure of risk is volatility in revenue. The independent variables of interest are "family firm". We include the control variables ROA lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

H2B Dependent variable: volatility in revenue		PLS
Family variable	entrepreneurial family firm	-0,0105**
		(0,0043)
	single owner family firm	-0,0133***
		(0,0045)
	classical family firm without family ceo	-0,0036
		(0,0036)
	classical family firm with family ceo	-0,0234***
		(0,0021)
Control variables	roa_1	-0,0596***
		(0,0045)
	company size_1	-0,1208***
		(0,0017)
	leverage_1	0,0646***
		(0,0031)
	herfindahl index	-0,0155**
		(0,0062)
	number of owners	0,0007***
		(0,0002)
	asset intensity_1	0,0874***
		(0,0016)
	company age	-0,0023***
		(0,0001)
	tangibility	-0,1055***
		(0,0044)
	age ceo	-0,0011***
		(0,0001)
Year effect	growth in GDP	0,3073***
		(0,0253)
Industry	AFFM	0,0150
		(0,0099)
	MACH	0,0022
		(0,0089)
	ENGY	-0,0333*
		(0,0178)
	ICOR	0,0705***
		(0,0088)
	LOGI	0,0100
		(0,0092)
	TRAD	-0,0094
		(0,0087)
	SERV	-0,0048
		(0,0086)
	HEDU	-0,0405***
		(0,0093)
	constant	0,8961***
		(0,0181)
	Number of observations	229 076
	Clusters (firms)	43 388
	P-value	0,0000
	R-squared	0,1925

Table 9: The dependent variable as a measure of risk is volatility in revenue. The independent variables of interest are "entrepreneurial family firm", "single owner family firm", "classical family firm without family CEO" and "classical family firm with family CEO". We include the control variables ROA lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

The Return to Risk Tradeoff

In the third segment of hypotheses, we investigate the relationship between the return to risk tradeoff, measured by the return to risk ratio, and being family firms.

Hypothesis H3A

Question: Do family firms have a better return to risk tradeoff than non-family firms?

> **H0:** Family firms are not associated with a higher return to risk ratio than non-family firms
>
> **HA:** Family firms are associated with a higher return to risk ratio than non-family firms

Under hypothesis H3A, we investigate the relationship between the return to risk tradeoff and being a family firm. In table 10, we observe that the coefficient for the variable ‹‹family firm›› is positively statistically significantly different from zero at the 1% level, in both models. We therefore find support for the alternative hypothesis by rejecting the null hypothesis.

The pooled least squares model suggests that being a family firm is associated with a positive correlation between family firms and the return to risk ratio. Excluding the industry variables, all the independent variables are significant at the 1% level, except age of CEO which is significant at the 5% level.

The fixed effects model suggests that becoming a family firm is associated with a positive correlation between family firms and the return to risk ratio. All independent variables are significant at the 1% level, except number of owners which is not statistically significant.

Both models support the hypothesis of higher return to risk ratio for the family firms than for the non-family firms.

Hypothesis H3B

Question: Do entrepreneurial family firms have a worse return to risk tradeoff than other types of family firms?

> **H0:** Entrepreneurial family firms are not associated with a lower return to risk ratio than other firm types
>
> **HA:** Entrepreneurial family firms are associated with a lower return to risk ratio than other firm types

Under hypothesis H3B, we are interested in how the relationship between risk and performance is for the entrepreneurial family firms compared to the other types of family firms. The results are very interesting indeed. While literature suggests that the entrepreneurial family firms are not compensated for their risk, the results suggest the opposite. In both of the regression models, we find positively statistically significant coefficients for the entrepreneurial family firm variable at the 1% level. Furthermore, we also find that the entrepreneurial family firms indeed are associated with the strongest positive correlation with the return to risk ratio among the family firms, suggesting that they are compensated by the highest return on their level of risk.

The pooled least squares model suggests that entrepreneurial family firms are associated with the strongest positive correlation with the return to risk ratio compared to the other family firms and non-family firms. The single owner family firm coefficient is not significant. The coefficient for classical family firms without CEO, significant at the 1% level, suggests negative correlation between the firm type and the return to risk ratio. Finally, the classical family firms with family CEO seem to be associated with a positive correlation with the return to risk ratio. Excluding the industry variables and the Herfindahl index, all independent variables are significant. Age of CEO is significant at the 5% level and the others at the 1% level.

The fixed effects model suggests that becoming entrepreneurial family firms are associated with the strongest positive correlation with the return to risk ratio compared to becoming one of the other family firm types or non-family firms. Unlike in the pooled least squares model, becoming single owner family firms have a positively statistically significant coefficient at the 1% level, suggesting that their correlation with return to risk ratio is almost as high as for the entrepreneurial family firms. The classical family firm coefficient is not statistically significant, but the sign is negative in this model as well. Finally, the classical family firms with family CEO have a positively statistically significant coefficient at the 1% level, suggesting a positive relation between becoming the firm type and the return to risk ratio. Moreover, they are beaten by the entrepreneurial family firms in this model as well. All the independent variables, except number of owners, which is not statistically significant, are statistically significant at the 1% level.

In both of the models we find the opposite of what literature describes regarding the entrepreneurial family firms and the return to risk ratio. In this Norwegian sample, these firms seem to enjoy the highest return to their level of risk. This is indeed new contribution in this field of research, which is of course very interesting. Since, these findings are contradicting existing literature, they will be subject to further robustness tests and the cohort study in order to shed more light on matter.

H3A

Dependent variable: return to risk ratio		**PLS**	**Fixed Effects**
Family variable	family firm	0,0293***	0,0468***
		(0,0111)	(0,0117)
Control variables	roa_1	1,7881***	0,1985***
		(0,0245)	(0,0127)
	company size_1	0,0479***	0,1436***
		(0,0049)	(0,0049)
	leverage_1	-0,3362***	0,5514***
		(0,0147)	(0,0215)
	herfindahl index	0,1036***	-0,0778***
		(0,0173)	(0,0243)
	number of owners	-0,0056***	0,0001
		(0,0007)	(0,0006)
	asset intensity_1	0,1766***	-0,2877***
		(0,0053)	(0,0073)
	company age	-0,0039***	0,0175***
		(0,0005)	(0,0011)
	tangibility	-0,5266***	-1,1095***
		(0,0192)	(0,0418)
	age ceo	-0,0009**	-0,0027***
		(0,0004)	(0,0006)
Year effect	growth in GDP	3,0487***	4,0239***
		(0,1162)	(0,1021)
Industry	AFFM	-0,0925**	
		(0,0392)	
	MACH	-0,0485	
		(0,0368)	
	ENGY	0,6101***	
		(0,0865)	
	ICOR	0,0659*	
		(0,0350)	
	LOGI	0,0678*	
		(0,0377)	
	TRAD	-0,0567	
		(0,0350)	
	SERV	0,2054***	
		(0,0350)	
	HEDU	0,4595***	
		(0,0409)	
	constant	-2,6203***	2,7289***
		(0,0738)	(0,0935)
	Number of observations	338 875	338 875
	Clusters (firms)	60 114	60 114
	P-value	0,0000	0,0000
	R-squared	0,1352	
	R-squared within		0,0445
	R-squared overall		0,0019
	Rho		0,7200
	Hausman P-value		0,0000

Table 10: The dependent variable is the return to risk ratio. The independent variable of interest is "family firm". We include the control variables ROA lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

H3B Dependent variable: return to risk ratio		PLS	Fixed Effects
Family variable	entrepreneurial family firm	0,0981***	0,1009***
		(0,0216)	(0,0231)
	single owner family firm	0,0236	0,0857***
		(0,0235)	(0,0238)
	classical family firm without family ceo	-0,0788***	-0,0047
		(0,0207)	(0,0193)
	classical family firm with family ceo	0,0406***	0,0554***
		(0,0113)	(0,0120)
Control variables	roa_1	1,7840***	0,1983***
		(0,0245)	(0,0127)
	company size_1	0,0486***	0,1435***
		(0,0049)	(0,0049)
	leverage_1	-0,3346***	0,5516***
		(0,0147)	(0,0215)
	herfindahl index	0,0490	-0,1355***
		(0,0316)	(0,0368)
	number of owners	-0,0058***	0,0001
		(0,0007)	(0,0006)
	asset intensity_1	0,1765***	-0,2879***
		(0,0053)	(0,0073)
	company age	-0,0030***	0,0177***
		(0,0005)	(0,0011)
	tangibility	-0,5274***	-1,1103***
		(0,0192)	(0,0418)
	age ceo	-0,0009**	-0,0026***
		(0,0004)	(0,0006)
Year effect	growth in GDP	3,0928***	4,0318***
		(0,1160)	(0,1022)
Industry	AFFM	-0,0951**	
		(0,0391)	
	MACH	-0,0505	
		(0,0368)	
	ENGY	0,6052***	
		(0,0862)	
	ICOR	0,0622*	
		(0,0349)	
	LOGI	0,0654*	
		(0,0376)	
	TRAD	-0,0576*	
		(0,0350)	
	SERV	0,2037***	
		(0,0349)	
	HEDU	0,4540***	
		(0,0408)	
	constant	-2,6172***	2,7478***
		(0,0743)	(0,0942)
	Number of observations	338 875	338 875
	Clusters (firms)	60 114	60 114
	P-value	0,0000	0,0000
	R-squared	0,1357	
	R-squared within		0,0447
	R-squared overall		0,0018
	Rho		0,7200
	Hausman P-value		0,0000

Table 11: The dependent variable is the return to risk ratio. The independent variable of interest is "entrepreneurial family firm". We include the control variables ROA lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

Test for Robustness

In order to control the validity of our models, we will run robustness tests in the form of alternative models. First, we will present the results from propensity score matching on all three segments of hypotheses, to further investigate the treatment effect of being certain types of family firms on the dependent variables for performance, risk and the return to risk ratio. Thereafter, we control for self-selection bias as source of endogeneity by using the Heckman two-step methodology. In models where we find statistically significant evidence of selection bias, we take further actions by conducting the switching regression methodology. The latter will allow us to interpret the effect of being a certain type of family firm, adjusted for the unwelcomed self-selection bias.

Propensity Score Matching

In the propensity score matching (PSM) we use the truncated sample in order to meet the condition of common support in the sample. In panel 8, the main results for all test are presented. In the different tests, different family variables are used as treatment variables in order to investigate the average treatment effect (ATE).

In descriptive statistics it is observed that the different firm types have different firm characteristics. In order to match apples to apples it is interesting to match the different firm types on their observed firm characteristics. This will expediently test the robustness of our main findings.

For the first segment, consisting of H1A and H1B, the results from the pooled least squares and the fixed effects models suggested that both family firms and further family firms with family CEO, were positively correlated with ROA as performance measure, and that they outperformed non- family firms and family firms without family CEO.

For the first segment we match on the observed firm characteristics company size, leverage, asset intensity, company age, tangibility, age of CEO, growth in GDP and the industry variables.

Based on the observed firm characteristics, the PSM for H1A do not find a statistically significant average treatment effect of being a family firm based. Thus, we will investigate the effect of private information in the self-selection model. However, there is evidence of a positively significant average treatment effect on the 1% level of having a family CEO among the family firms. This result is supporting the findings from the main models, suggesting that family firms with

family CEO are more positively correlated with performance than the firms without family CEO.

For the second segment, the results from the pooled least squares and the fixed effects models suggested that family firms are associated with less risk than the non-family firms. Further, the results suggested that the classical family firms with family CEO are associated with the lowest level of risk.

The main hypothesis H2B, also emphasised the relation between the single owner family firms and risk, however due to the difference in age characteristics, matching by propensity score on firm characteristics in not a suitable robustness test for this dimension. Therefore, we will only investigate the average treatment effect on volatility in revenue of being classical family firms with family CEO.

For the second segment we match on the observed firm characteristics company size, leverage, asset intensity, ROA, company age, tangibility, age of CEO, growth in GDP and the industry variables.

The PSM for H2A and H2B, support these findings as we observe negatively statistically significant average treatment effects on the 1% level. In H2A, the average treatment effect suggest that family firms are associated with lower levels of risk than non-family firms. For H2B, the propensity score matching supports the main findings by suggesting that being classical family firms with family CEO are associated with less risk than the other family firms.

In the third segment of our main models the results suggested that family firms are associated with a higher return to risk ratio than non-family firms. The PSM on H3A finds supportive evidence for a statistically significant average treatment effect of being a family firm on the return to risk ratio at the 5% level.

The main results for H3B suggested that entrepreneurial family firms are associated with the highest return to risk ratio. The PSM on H3B support the results from the main regressions by a positively significant average treatment effect on the 1% level of being an entrepreneurial family firm on the return to risk ratio.

In the third segment, we match on the observed firm characteristics company size, leverage, asset intensity, company age, tangibility, age of CEO, growth in GDP and the industry variables. In order to not violate the assumption of common support, company age is not included in the model H3B. Also, the industry variable ENGY is dropped due to multicollinearity.

Propensity Score Matching

H1A	
Dependent variable: ROA	
ATE - family firm	-0,0013
	(0,0011)
Number of observations	117 023

H1B	
Dependent variable: ROA	
ATE - family ceo	0,0131***
	(0,0030)
Number of observations	102 353

H2A	
Dependent variable: volatility in revenue	
ATE - family firm	-0,00146***
	(0,0018)
Number of observations	81 982

H2B	
Dependent variable: volatility in revenue	
ATE - classical family firm with family ceo	-0,00156***
	(0,0017)
Number of observations	72 441

H3A	
Dependent variable: return to risk ratio	
ATE - family firm	0,0284**
	(0,0111)
Number of observations	117 023

H3B	
Dependent variable: return to risk ratio	
ATE - entrepreneurial family firm	0,0820***
	(0,0179)
Number of observations	117 023

Table 12: The table presents the average treatment effect associated with the different firm types in the propensity score matching models. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively.

Heckman Self-Selection Model

We conduct the selection models on the same sample as the propensity score matching. All of the six complete models are provided in appendix 8. In these tests we interpret the inverse Mills ratio to determine whether private information emerging as omitted variable bias may cause endogeneity.

Only the model for hypothesis H2A, shows a coefficient for lambda, the inverse Mills ratio, that is statistically significantly different from zero at the 1% level, suggesting self-selection in the sample. In this model, the selection variable is the dummy variable ‹‹family firm››. Thus, we will investigate this model further by conducting the switching regressions methodology. In the other models we cannot reject the null hypothesis of absence of self-selection.

Switching Regressions Model

To robust test the model for H2A where the Heckman self-selection model suggested self-selectivity, we conduct the endogenous switching regression model presented in appendix 9.

The estimated covariances, sigma, are both statistically significant on the 1% level, which indicates that sample selectivity bias is not absent.

We observe that the estimated coefficient of correlation between the selection equation and each of the two main regression equations, rho, are statistically significantly different from zero at the 1% level. Between the estimated model for family firms and the selection equation, we observe a positive correlation, which suggests that the firms who choose to be family firms are associated with a lower volatility in revenue than a random firm from the sample. The opposite is suggested for the non-family firms. Between the estimated regression for the non-family firms and the selection equation, we observe a negative correlation, suggesting that the firms who chose to be non-family firms are associated with a higher volatility in revenue than a random firm from the sample. These results support the results from the main models.

8. Cohort Study

The results from the main regressions indicate that the entrepreneurial family firms are not associated with extensive risk resulting in poor performance. In fact, entrepreneurial family firms have the highest positive correlation with the performance measure ROA and the return to risk ratio. Therefore, the results from the main regressions do not support the existing literature. Hence, we introduce the cohort study in addition to our main regression to really give the literature a chance.

In this study we relax the constraint on average revenue to have a lower limit on NOK50.000 to give every startup within the different firm types a fair chance and an even more realistic picture of the startups which are not included in the main sample.

The sample is unbalanced in order to allow for descriptive survival probability analysis. Further, the sample is quite differently weighted with respect to number of observations on the different firm types. Single owner family firms are naturally excluded by the company age restriction. Appendix 11 provides further descriptive statistics.

Cohort Regressions

This section is divided in three segments covering performance, risk and the return to risk ratio, respectively. As in the main analysis we conduct both pooled least squares and fixed effects methodology when investigating the three segments of hypotheses. Furthermore, an additional descriptive survival study is conducted to shed light on the risk association and performance for the different firm types.

Regarding the fixed effects models, one of its shortcomings may emerge in this cohort study. Since the model only capture the effect of a firm becoming a specific firm type there may be few observations of changes. It is reasonable to assume that a firm do not change firm type very often over the first five years. Also, in table 16 one can observe that there are quite few new firms introduced to the sample each year.

Performance

For the first segment regarding performance and hypothesis H1B, the regression results are presented, table 13. Again, we are interested in the relation between the family firm variables and performance in terms of ROA.

In the pooled least squares model, the coefficient for classical family firms with family CEO is statistically significant at the 1% level. It is also showing the highest positive correlation with the performance measure ROA. Previous regression on the main sample suggested that entrepreneurial family firms had the most positive correlation with ROA, running the cohort, entrepreneurial family firms are associated with a somewhat lower performance than classical family firms with family CEO. The coefficient for the entrepreneurial family firms is statistically significant at the 5%level. The classical family firms without family CEO have a negative correlation with ROA, statistically significant at the 1% level, suggesting that they are associated with a lower performance than the control group.

In the fixed effects model, becoming an entrepreneurial family firm is associated with the highest positive correlation with ROA, significant at the 10% level, which supports the results from the main analysis. The coefficient for the classical family firms with family CEO is not statistically significant. Lastly, the coefficient for the classical family firms without family firms shows a negative relation with ROA, statistically significant at the 5% level.

Risk

For the second segment, regarding risk and hypothesis H2B, the regression results are presented, in table 14. Here, the main object of interest is the relation between the family firm variables and risk in terms of volatility in revenues.

In the pooled least squares model, the coefficient for the classical family firms with family CEO is negatively statistically significantly different from zero at the 1% level. This is the only statistically significant family firm coefficient suggesting that the classical family firms with family CEO are associated with the lowest level of risk among the cohorts. This result support the findings from the main models.

The fixed effects model is in this context inconclusive since none of coefficients for the family firm dummy variables are statistically different from zero. This may be due to the aforementioned shortfalls of the fixed effects model in the cohort study. Moreover, as the dependent variable, volatility in revenue, is only observed for the last two years of each cohort, the observations are very few and the variation for the dummy variable thus seems to be insignificant.

Return to Risk Tradeoff

For the third segment regarding the return to risk ratio and hypothesis H3B, the regression results are presented in table 15. The main objective of interests is the relationship between the family firm variables and the return to risk ratio.

In the pooled least squares model the coefficients for all three family firm variables are statistically significant, at the 1% level for the classical family firms and the 5% level for the entrepreneurial family firms. The classical family firms with family CEO are the most positively associated with the return to risk ratio followed by the entrepreneurial family firms. The classical family firms without family CEO are associated with a negative return to risk ratio.

In the fixed effects model, the results suggest that becoming an entrepreneurial family firm is positively significantly associated the return to risk ratio at the 10% level. Further, becoming a classical family firm without family CEO is negatively related to the return to risk ratio at the 5% level. The coefficient for the classical family firms with family CEO is not statistically significant.

The results regarding the return to risk ratio for the cohorts suggests that classical family firms with family CEO are most positively correlated with the return to risk ratio followed by the entrepreneurial family firms. This result is different from the main regression, however, not contradicting as it still suggests that the entrepreneurial family firms have a better return to risk tradeoff than the classical family firms without family CEO and the control group of non-family firms.

H1B

Dependent variable: ROA		PLS	Fixed Effects
Family variables	entrepreneurial family firm	0,01182**	0,0225*
		(0,0059)	(0,0119)
	classical family firm with family ceo	0,02338***	0,0053
		(0,0027)	(0,0057)
	classical family firm without family ceo	-0,0455***	-0,0239**
		(0,0062)	(0,0112)
Control variable	company size_1	0,0130***	0,0203***
		(0,0011)	(0,0022)
	leverage_1	-0,0839	0,2255***
		(0,0054)	(0,0138)
	herfindahl index	0,0282	-0,0282
		(0,0094)	0,0202
	number of owners	-0,0018***	0,0008**
		(0,0003)	(0,0004)
	asset intensity_1	0,0361***	-0,0932***
		(0,0014)	(0,0039)
	company age	-0,0010	-0,003***
		(0,0007)	(0,0009)
	tangibility	-0,1031***	-0,2425***
		(0,0048)	(0,0117)
	age ceo	0,0005***	0,0006
		(0,0001)	(0,0005)
Year effect	growth in GDP	0,4041***	0,2710***
		(0,0410)	(0,0422)
Industry	AFFM	0,0183*	
		(0,0110)	
	MACH	-0,0051	
		(0,0107)	
	ENGY	0,0668***	
		(0,0140)	
	ICOR	0,0172*	
		(0,0101)	
	LOGI	0,0246**	
		(0,0106)	
	TRAD	-0,0272***	
		(0,0103)	
	SERV	0,0211**	
		(0,0102)	
	HEDU	0,0565***	
		(0,0107)	
	constant	-0,6688***	1,0405***
		(0,0197)	(0,0501)
	Number of observations	115 677	115 677
	Clusters (firms)	35 755	35 755
	P-value	0,0000	0,0000
	R-squared	0,0572	
	R-squared within		0,0639
	R-squared overall		0,0118
	Rho		0,6691
	Hausman P-value		0,0000

Table 13: The dependent variable as a measure of performance is ROA. The independent variables of interest are "entrepreneurial family firm", "classical family firm with family CEO" and "classical family firm without family CEO". We include the control variables company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

H2B

Dependent variable: volatility in revenue		PLS	Fixed Effects
Family variables	entrepreneurial family firm	-0,0141	0,0048
		(0,0090)	(0,0144)
	classical family firm with family ceo	-0,0475***	-0,0008
		(0,0045)	(0,0126)
	classical family firm without family ceo	0,0056	0,0031
		(0,0088)	(0,0083)
Control variables	roa_1	-0,0746***	0,0222***
		(0,0071)	(0,0060)
	company size_1	-0,1462***	-0,0888***
		(0,0020)	(0,0042)
	leverage_1	0,0555***	0,0118*
		(0,0048)	(0,0072)
	herfindahl index	-0,0831***	-0,0006
		(0,0142)	(0,0237)
	number of owners	0,0013***	-0,0009**
		(0,0003)	(0,0005)
	asset intensity_1	0,1017***	0,0005
		(0,0025)	(0,0052)
	company age	-0,0646***	-0,0605***
		(0,0015)	(0,0013)
	tangibility	-0,1422***	0,0205
		(0,0084)	(0,0133)
	age ceo	-0,0014***	0,0000
		(0,0002)	(0,0005)
Year effect	growth in GDP	0,5980***	0,2332***
		(0,0717)	(0,0554)
Industry	AFFM	0,0305*	
		(0,0160)	
	MACH	0,0006	
		(0,0147)	
	ENGY	0,0530*	
		(0,0285)	
	ICOR	0,0909***	
		(0,0141)	
	LOGI	-0,0014	
		(0,0151)	
	TRAD	-0,0021	
		(0,0141)	
	SERV	-0,0009	
		(0,0139)	
	HEDU	-0,0666***	
		(0,0148)	
	constant	1,4473***	1,8968***
		(0,0309)	(0,0745)
	Number of observations	51 433	51 433
	Clusters (firms)	25 090	25 090
	P-value	0,0000	0,0000
	R-squared	0,2875	
	R-squared within		0,1787
	R-squared overall		0,1731
	Rho		0,8162
	Hausman P-value		0,0000

Table 14: The dependent variable as a measure of risk is volatility in revenue. The independent variables of interest are "entrepreneurial family firm", "classical family firm with family CEO" and "classical family firm without family CEO". We include the control variables ROA lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

H3B

Dependent variable: return to risk ratio		PLS	Fixed Effects
Family variables	entrepreneurial family firm	0,0681**	0,0778*
		(0,0306)	(0,0425)
	classical family firm with family ceo	0,0843***	0,0249
		(0,0155)	(0,0229)
	classical family firm without family ceo	-0,1505***	-0,0850**
		(0,0306)	(0,0368)
Controll variable	roa_1	1,0845***	-0,2720***
		(0,0228)	(0,0169)
	compsize_1	0,0787***	0,0837***
		(0,0050)	(0,0068)
	leverage_1	-0,2791***	0,6308***
		(0,0184)	(0,0418)
	herfindahl	0,1060**	-0,0303
		(0,0465)	(0,0710)
	number of owners	-0,0080***	0,0018*
		(0,0012)	(0,0009)
	assetintensity_1	0,1828***	-0,3131***
		(0,0067)	(0,0119)
	company age	-0,0099***	0,0010
		(0,0030)	(0,0034)
	tangibility	-0,5695***	-1,2527***
		(0,0234)	(0,0381)
	ageceo	0,0017***	0,0011
		(0,0006)	(0,0016)
Year effect	growth in GDP	1,5680***	1,4596***
		(0,2030)	(0,1806)
Industry	AFFM	-0,0474	
		(0,0435)	
	MACH	-0,0172	
		(0,0427)	
	ENGY	0,5111***	
		(0,0718)	
	ICOR	0,1168***	
		(0,0382)	
	LOGI	0,0896**	
		(0,0448)	
	TRAD	-0,1151***	
		(0,0385)	
	SERV	0,1826***	
		(0,0377)	
	HEDU	0,3893***	
		(0,0443)	
	constant	-3,3053***	3,7606***
		(0,0893)	(0,1672)
	Number of observations	115 677	115 677
	Clusters (firms)	35 755	35 755
	P-value	0,0000	0,0000
	R-squared	0,1346	
	R-squared within		0,0625
	R-squared overall		0,0176
	Rho		0,7443
	Hausman P-value		0,0000

Table 15: The dependent variable tradeoff is the return to risk ratio. The independent variables of interest are "entrepreneurial family firm", "classical family firm with family CEO" and "classical family firm without family CEO". We include the control variables ROA lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Cluster-robust standard errors are reported in parenthesis under the respective coefficients.

Survival

It is reasonable to assume that firms who survive for the first five years are more successful than the firms who die, therefor it is important to address the survival of the firm types as well as the performance and risk measures.

As an alternative measure to provide insight to both performance and risk, table 16 presents descriptive statistic on number of family and non-family firms for their first five living years, regardless of point in time between 2000 and 2015. These statistics are also graphically represented in figure 8. We emphasize that the numbers are a bit noisy since they also capture changes in firm type for individual firms. However, we assume that the majority of observations come from new firms and firm deaths. The main objective is to provide insight to whether family firms seem to take on less risk than non-family firms or not. Complete descriptive statistics for the cohort sample is provided in appendix 10.

We find that all types of family firms have higher average company age than the non-family firms. As a result of the higher average company age for the family firms, we see that they are associated with less percentage company deaths. Hence, it seems to be a higher probability of survival for the family firms than non-family firms. This observation might indicate that family firms may take on less risk than the non-family firms, that they perform better or a combination of both.

Further, we find that being an entrepreneurial family firm is associated with the highest average company age and the lowest rate of decrease in number of firms, which may indicate that indeed the entrepreneurial family firms do not burn money and take in excessive risk.

Again, these descriptive observations are contradicting to the existing literature on the area. However, since this is just a statistical description of the data, findings are stated as merely sample population observations and not statistically significant findings.

Total Number of Firms in the Cohort Study

Total	Entrepreneurial family firm	% - change	Classical family firm w/ family ceo	% - change	Classical family firm w/o family ceo	% - change	Non-family firm	% - change
Beginning (1)	10 942		7 646		1201		9 708	
(2)	11 986	*9,54 %*	8 507	*11,26 %*	1 423	*18,48 %*	10 492	*8,08 %*
(3)	11 525	*-3,85 %*	8 185	*-3,79 %*	1 324	*-6,96 %*	9 616	*-8,35 %*
(4)	10 583	*-8,17 %*	7 308	*-10,71 %*	1 156	*-12,69 %*	8 433	*-12,30 %*
End (5)	9 763	*-7,75 %*	6 465	*-11,54 %*	984	*-14,88 %*	7 326	*-13,13 %*
Total firms	54 799		38 111		6 088		45 575	
Avg increase/decrease		*-2,56 %*		*-3,69 %*		*-4,01 %*		*-6,43 %*
Avg company age	2,93		2,91		2,88		2,85	

Table 16: The table presents the number of firms for each firm type for each of the observed five years of the cohort. The sample consists of all twelve cohorts from 2000 throughout 2011.

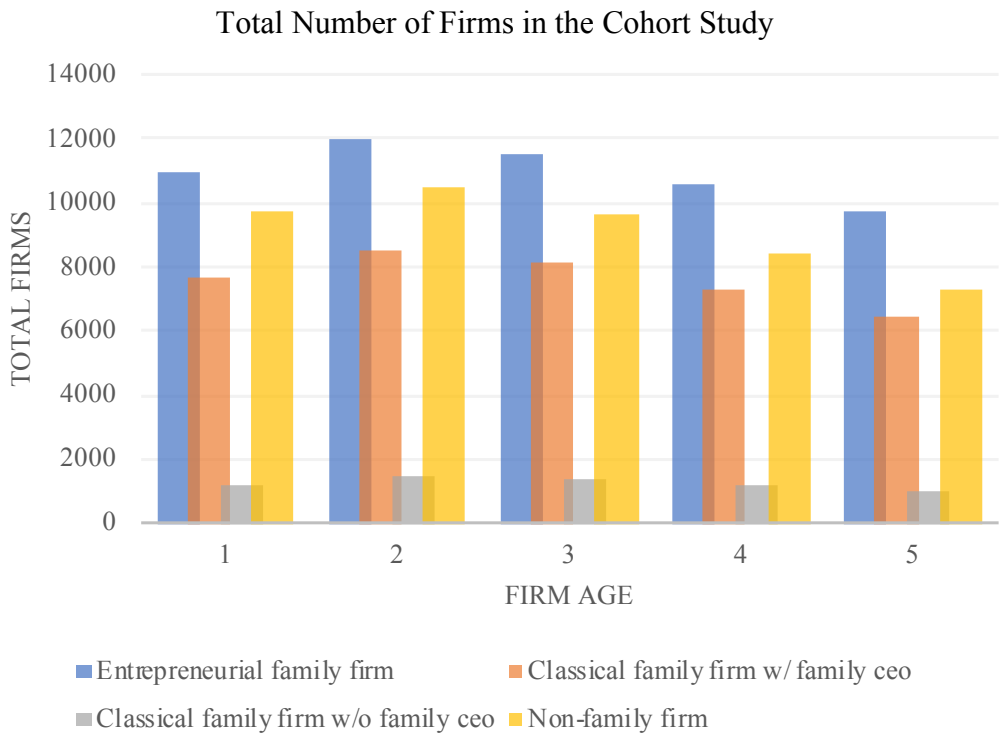


Figure 8: The figure presents the number of firms for each firm type for each of the observed five years of the cohort. The sample consists of all twelve cohorts from 2000 throughout 2011.

Test for Robustness in the Cohort Study

As in the main analysis, robustness checks are conducted in the form PSM, self-selection models and switching regressions methodology.

Propensity Score Matching

The results from the propensity score matching are presented in table 17. In regard to the cohort regression on ROA, we find a positively statistically significant average treatment effect (ATE) on the 1% level of being entrepreneurial family firms. This is consistent with pooled least squares and fixed effects models, suggesting a positive relation between the firm type and performance.

In the matching model on ROA, we match on the observed firm characteristics company size, leverage, asset intensity, company age, tangibility, age of CEO, growth in GDP and the industry variables.

For the risk measure, we find the ATE of being entrepreneurial family firms to be negatively statistically significant at the 1% level, suggesting that the firm type is associated with lower volatility in revenue. In the cohort regressions on volatility in revenue we did not find statistically significant coefficients for the entrepreneurial family firms, making the PSM results the only indication of risk association in the cohort study so far.

In the matching model on volatility in revenue, we match on the observed firm characteristics ROA, company size, leverage, asset intensity, company age, tangibility, age of CEO, growth in GDP and the industry variables.

Turning to the return to risk ratio we find that the ATE of being entrepreneurial family firms is positively significant at the 1% level. This result might indicate that the classical return to risk tradeoff does not hold as entrepreneurial family firms seem to perform better and at the same time be associated with the lowest level of risk. The result is not only a better tradeoff, one might say that the tradeoff does not exist at all.

In the matching model on the return to risk ratio, we match on the observed firm characteristics ROA, company size, leverage, asset intensity, company age, tangibility, age of CEO, growth in GDP and the industry variables. In the matching model on both volatility in revenue and the return to risk ratio, we include ROA as a matching variable. This is in order to even better isolate the average treatment effect of being entrepreneurial family firms.

PSM - Cohort Study	
Dependent variable: ROA	
ATE - entrepreneurial family firms	0,0226***
	(0,0020)
Number of observations	115 677
Dependent variable: volatility in revenue	
ATE - entrepreneurial family firms	-0,0372***
	(0,0030)
Number of observations	51 433
Dependent variable: return to risk ratio	
ATE - entrepreneurial family firma	0,1015***
	(0,1010)
Number of observations	115 677

Table 17: The table presents the average treatment effect associated with the entrepreneurial family firms in the propensity score matching models with respect to ROA, volatility in revenue and the return to risk ratio. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively.

Heckman Self-Selection Model

Since the cohort sample is very restricted and selected with respect to family and age variables, the self-selection issue is highly likely and might cause the estimates from the main models to be biased and of little interpretational value. Thus, we control for self-selection by applying the Heckman two-step methodology. Complete models and results are presented in appendix 12. The three models are run on the same sample as the cohort study and the propensity score matching. The dummy variable for being an entrepreneurial family firm is used as selection variable in all models.

In the first model we investigate the relation between ROA and entrepreneurial family firms. Again, we interpret the inverse Mills ratio as an indication for private information and self-selection. The coefficient is negatively statistically significant at the 5% level, and we reject the null hypothesis of absence of self-selection.

In the second model, we investigate the relation of the entrepreneurial family firms and the risk volatility in revenue. The coefficient for the inverse Mills ratio is positively statistically significant at the 1% level, suggesting self-selection in the model as well.

Lastly, we look to the relationship between the entrepreneurial family firms and the return to risk ratio. In this model the coefficient for the inverse Mills ratio is negatively statistically significant at the 1% level, suggesting self-selection.

All three models suggest self-selection. Thus, the switching regressions methodology will be applied in order to interpret the effect associated with being an entrepreneurial family firm on the dependent variables.

Switching Regressions Model

The switching regressions models are run on the same cohort sample as the rest of the cohort models. Again, we look at the relation between being an entrepreneurial family firm and ROA, volatility in revenue and the return to risk ratio, respectively.

In these models, we interpret the estimated covariance, sigma, and the estimated coefficient of correlation, rho, between the error term of selection model and the error terms from the two estimated regression equations for the two groups, entrepreneurial family firms and not entrepreneurial family firms. Complete models and result are presented in appendix 13.

In all three models, sigma for both of the regression equations are statistically significantly different from zero, which is an indication of sample selection. However, the standard errors are assumed to produce consistent estimators.

In the first model, we observe that both of the estimated coefficients of correlation, rho, are statistically significant at the 1% level. For the group of entrepreneurial family firms, rho is negative suggesting that the entrepreneurial family firms are associated with higher ROA than a random firm from the sample. For the group that are not entrepreneurial family firms, rho is positive, suggesting that these firms are associated with a lower ROA than a random firm from the sample.

In the second model, we observe that both of the estimated coefficients of correlation, rho, are statistically significant at the 1% level. For the group of entrepreneurial family firms, rho is positive suggesting that the entrepreneurial family firms are associated with lower volatility in revenue than a random firm from the sample. For the group that are not entrepreneurial family firms, rho is negative, suggesting that these firms are associated with a higher volatility in revenue than a random firm from the sample.

In the last model, we observe that only the estimated coefficient of correlation, rho, for the group that is not entrepreneurial family firms is statistically significant, and

at the 10% level. For the group that are not entrepreneurial family firms, rho is positive, suggesting that these firms are associated with a lower return to risk ratio than a random firm from the sample.

Moreover, in the last model, the likelihood ratio test for joint independence for the three equations we observe a p-value of 0,3945, thus we cannot reject the null hypothesis that the equations are independent. This suggest that we cannot statistically support that being an entrepreneurial family firm has a significant effect on the return to risk ratio.

The results from the switching regressions model support the main models and the robustness models in the cohort study with respect to performance and risk.

Summary of the Cohort Study

As implied in our main cohort results, entrepreneurial family firms do not burn money as predicted by previous literature. In fact, the entrepreneurial family firms tend to perform well and take on less risk than the family firms without family CEO and the non-family firms. This is also backed by the robustness tests by propensity score matching models and switching regressions models.

Another intriguing finding in our main cohort models of pooled least squares is that we find statistically significant evidence at 1% level, that the classical family firms with family CEO are associated with the highest performance, bear less risk and have the best return to risk tradeoff. This result implies that the classical return to risk tradeoff may not apply in this case.

A possible explanation for why classical family firms with family CEO and entrepreneurial family firms seem to get away with lower risk and higher performance may be inferred by the theory of information asymmetry and the pecking order theory. The firms might be peaches instead of lemons as they may come across good investment opportunities which are not available to all participant in the market and that they might choose to fund it themselves with internal funds instead of seeking new creditors or shareholders.

9. Conclusion

The purpose of the thesis is to investigate whether a tradeoff between risk and return to that risk in terms of performance exists for Norwegian non-listed family firms. Financial theory states that in efficient markets, risky investments should be compensated by proportional return to that risk. However, it seems that for some of the non-listed family firms in Norway, higher performance is possible while at the same time taking on less risk. This suggests that the return to risk tradeoff may actually be absent, which is contradicting existing literature and indeed a new contribution in the world of corporate finance.

Regarding established theory within corporate finance it is interesting to discover that we do find supportive evidence to the theory that absence of agency cost does enhance performance in family firms with family CEO. Further, the theory regarding adverse selection and the pecking order theory seem to be relevant when explaining why family firms might outperform non-family firms. In this context the family firms may be viewed as peaches who prefer to fund their investment opportunities with internal funding.

In order to shed light on the return to risk tradeoff for Norwegian non-listed family firms, we start by investigating the underlying relationship between performance and risk and the family firms.

The main models in terms of pooled least squares and fixed effects indeed provide supportive evidence to the hypothesis that family firms outperform the non-family firms in Norway. Further, we find support to the hypothesis that family firms with family CEO from the family with the largest ultimate ownership perform better than the firms with a non-related CEO. Both results are interesting but supportive to existing literature.

From the robustness test by propensity score matching we do not find significant evidence to support that family firms outperform non-family firms, however there is a positively statistically significant average treatment effect of having a family CEO. The latter supports our main findings. Furthermore, we do not find evidence of self-selection by running the Heckman self-selection model when controlling for being a family firm or having a family CEO, which is good news with respect to the unwelcomed endogeneity.

In order to provide new contribution to the literature, we investigated the differences between the different types of family firms; entrepreneurial family firms, single owner family firms and classical family firms with family CEO. According to existing literature the entrepreneurial family firms should perform worse than the others. However, the results suggest the opposite. The entrepreneurial family firms and the single owner family firms seem to outperform not only the non-family firms and the classical family firms without family CEO, but also the classical family firms with family CEO. These results are rather intriguing, but also worth investigating closer in the cohort study.

Regarding risk, the pooled least squares model and the propensity score matching model supports existing literature with significant evidence to the hypothesis that family firms are associated with lower risk than non-family firms. However, the Heckman selection model suggest that we cannot rule out the possibility of self-selection. Thus, we move on with the switching regressions methodology to find that the family firms are associated with a lower level of risk than the non-family firms.

Further, literature suggests that the classical family firms with family CEO and the single owner family firms take on less risk than the others firm types, both family and non-family. The results from the pooled least squares model support the hypothesis. Due to imposed restrictions on the single owner family firms regarding firm age, we could not perform propensity score matching for these firms. However, propensity score matching suggest that there is a statistically significant average treatment effect of being classical family firm with family CEO on volatility in revenue, suggesting that these firms are associated with a lower level of risk than the other firm types.

So far, the findings suggest that some of the family firm types take on the least risk while at the same time enjoying the highest performance, which further implies that their return to risk tradeoff should be better than for the remaining company types, or even absent. And indeed, this is what we find.

The most intriguing result, which is the contradictive to existing literature, is that the entrepreneurial family firms seem to enjoy the highest compensation in terms of performance for their level of risk. For these firms, we observe the highest positive correlation to the return to risk ratio in both the pooled least squares model and the fixed effects model. By propensity score matching we confirm this finding

by a positively statistically significant average treatment effect of being an entrepreneurial family firm on the return to risk ratio.

The classical family firms with family CEO, who proved to take on the least risk, do actually seem to have a return to risk ratio which is only beaten by the entrepreneurial family firms. In general, we find support to the hypothesis that the non-listed family firms in Norway indeed have a better return to risk tradeoff than the non-family firms.

The additional cohort study puts the existing literature to test, and indeed we explore new findings. The classical family firms with family CEO seem to have the highest performance, the lowest risk and also the highest return to risk ratio, making them quite superior in this context.

What is really of great interest in the cohort study is that the entrepreneurial family firms which are believed to burn money and take on extensive risk not only seem to survive the longest, but also come in second place in terms of performance, level of risk and also the return to risk ratio. In this study they are only beaten by the classical family firms with family CEO. These final results, which are also backed by the robustness tests, are quite intriguing and an exciting contribution to the literature of corporate finance.

References

Akerloff, G. (1970). The market for lemons: Quality uncertainty and the market mechanism. *Quarterly journal of economics, 84*(3), 488-500.

Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *Journal of Finance, 58*(3), 1301-1328. doi:10.1111/1540-6261.00567

Asfaw, S. (2010). Estimating welfare effect of modern agricultural technologies: A micro-perspective from Tanzania and Ethiopia. *Unpublished manuscript. http://www. chronicpoverty. org/uploads/publication_files/asfaw_agricultural_technologie s. pdf*.

Barnes, L. B., & Hershon, S. A. (1989). Transferring power in the family business. *Family Business Review, 2*(2), 187-202.

Bennedsen, M., Nielsen, K. M., Perez-Gonzalez, F., & Wolfenzon, D. (2007). Inside the family firm: The role of families in succession decisions and performance. *Quarterly Journal of Economics, 122*(2), 647-691. doi:10.1162/qjec.122.2.647

Bernardo, A. E., & Welch, I. (2001). On the evolution of overconfidence and entrepreneurs. *Journal of Economics & Management Strategy, 10*(3), 301-330.

Berzins, J., Bøhren, Ø., & Rydland, P. (2008). Corporate finance and governance in firms with limited liability: Basic characteristics. *Centre for Corporate Governance Research*.

Bhaumik, S. K., & Gregoriou, A. (2010). 'FAMILY' OWNERSHIP, TUNNELLING AND EARNINGS MANAGEMENT: A REVIEW OF THE LITERATURE. *Journal of Economic Surveys, 24*(4), 705-730. doi:10.1111/j.1467-6419.2009.00608.x

Blanchflower, D., & Oswald, A. (1992). *Entrepreneurship, happiness and supernormal returns: Evidence from Britain and the US*. Retrieved from

Bodie, Z., Kane, A., & Marcus, A. J. (2014). *Investments* (10 ed.). McGraw-Hill Education: McGraw-Hill Education

Brealey, R., Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance, 32*(2), 371-387.

Brooks, C. (2014). *Introductory Econometrics for Finance* (3 ed.): Cambridge University Press.

Bryson, A., Dorsett, R., & Purdon, S. (2002). *The Use of Propensity Score Matching in the Evaluation of Active Labour Market Policies*. Policy Studies Institute and National Centre for Social Research. Retrieved from http://eprints.lse.ac.uk/4993/1/The_use_of_propensity_score_matching_in_the_evaluation_of_active_labour_market_policies.pdf

Brønnøysundregistrene. (2017). Næringskoder. Retrieved from https://www.brreg.no/bedrift/naeringskoder/

Burkart, M., Panunzi, F., & Shleifer, A. (2003). Family firms. *The Journal of Finance, 58*(5), 2167-2201.

Cadbury, S. A. (2000). *Family firms and their governance: Creating tomorrow's company from today's*: Egon Zehnder International London.

Che, L., & Langli, J. C. (2015). Governance structure and firm performance in private family firms. *Journal of Business Finance & Accounting, 42*(9-10), 1216-1250.

Christiansen, C. (1953). Management Succession in Small and Growing Enterprises. *Boston, MA: Division of Research, Graduate School of Business Administration, Harvard University*.

Chua, J. H., Chrisman, J. J., & Sharma, P. (1999). Defining the Family Business by Behavior. *Entrepreneurship: Theory & Practice, 23*(4), 19-39.

Cooper, A. C., Woo, C. Y., & Dunkelberg, W. C. (1988). Entrepreneurs' perceived chances for success. *Journal of business venturing, 3*(2), 97-108.

Corbetta, G., & Salvato, C. (2004). Self-serving or self-actualizing? Models of man and agency costs in different types of family firms: A commentary on "comparing the agency costs of family and non-family firms: Conceptual issues and exploratory evidence". *Entrepreneurship Theory and Practice, 28*(4), 355-362.

Crama, Y., Leruth, L., Renneboog, L., & Urbain, J.-P. (2003). Corporate control concentration measurement and firm performance. *Social Responsibility: Corporate Governance Issues*, 123-149.

Davidson, R., & MacKinnon, J. G. (2009). *Econometric Theory and Methods*: Oxford University Press.

Davis, J. H., Schoorman, F. D., & Donaldson, L. (1997). Toward a stewardship theory of management. *Academy of Management review, 22*(1), 20-47.

Donnelley, R. G. (1964). The family business. *Harvard Business Review, 42*(4), 93-105.

Dyer, W. G. (2006). Examining the "family effect" on firm performance. *Family Business Review, 19*(4), 253-273. doi:10.1111/j.1741-6248.2006.00074.x

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The journal of law and Economics, 26*(2), 301-325.

FFI. (2018). Global Data Point. Retrieved from http://www.ffi.org/page/globaldatapoints

Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: which factors are reliably important? *Financial management, 38*(1), 1-37.

Gersick, K. E., Davis, J. A., Hampton, M. M., & Lansberg, I. (1997). *Generation to generation: Life cycles of the family business*: Harvard Business Press.

Gomez-Mejia, L. R., Cruz, C., Berrone, P., & De Castro, J. (2011). The bind that ties: Socioemotional wealth preservation in family firms. *Academy of Management Annals, 5*(1), 653-707.

Hamelin, A. (2009). Do small family businesses have a peculiar attitude toward growth? Evidence from French SMEs. In: Working Papers CEB.

Hamilton, B. H. (2000). Does entrepreneurship pay? An empirical analysis of the returns to self-employment. *Journal of Political economy, 108*(3), 604-631.

Harris, L. C., & Ogbonna, E. (2007). Ownership and Control in Closely-held Family-owned Firms: An Exploration of Strategic and Operational Control. *British Journal of Management, 18*(1), 5-26.

Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica, 47*(1), 153-161. doi:10.2307/1912352

Hill, C. R., Griffiths, W. E., & Lim, G. C. (2012). *Principles of Econometrics* (4 ed.): John Wiley & Sons.

Huybrechts, J., Voordeckers, W., & Lybaert, N. (2013). Entrepreneurial risk taking of private family firms: The influence of a nonfamily CEO and the moderating effect of CEO tenure. *Family Business Review, 26*(2), 161-179.

Hvide, H. K., & Panos, G. A. (2014). Risk tolerance and entrepreneurship. *Journal of Financial Economics, 111*(1), 200-223. doi:https://doi.org/10.1016/j.jfineco.2013.06.001

Jaskiewicz, P., Klein, S., & Schiereck, D. (2005, 2005). *Family influence and performance-theoretical concepts and empirical results*.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics, 3*(4), 305-360.

Kanbur, S. M. (1979). Of Risk Taking and the Personal Distribution of Income. *Journal of Political Economy, 87*(4), 769-797. doi:10.1086/260792

Kandel, E., & Lazear, E. P. (1992). Peer Pressure and Partnerships. *Journal of Political Economy, 100*(4), 801-817. doi:10.1086/261840

Kellermanns, F. W., Eddleston, K. A., Barnett, T., & Pearson, A. (2008). An exploratory study of family member characteristics and involvement: Effects on entrepreneurial behavior in the family firm. *Family Business Review, 21*(1), 1-14.

Kihlstrom, R. E., & Laffont, J.-J. (1979). A General Equilibrium Entrepreneurial Theory of Firm Formation Based on Risk Aversion. *Journal of Political Economy, 87*(4), 719-748. doi:10.1086/260790

Knight, F. H. (1921). *Risk, uncertainty and profit*: Courier Corporation.

Koller, T., Goedhart, M., & Wessels, D. (2015). *Valuation - Measuring and Managing the Value of Companies* (6th ed.): John Wiley & Sons, Inc., Hoboken, New Jersey.

Kraus, A., & Litzenberger, R. H. (1976). Skewness preference and the valuation of risk assets. *The Journal of Finance, 31*(4), 1085-1100.

Kumar, K. B., Rajan, R. G., & Zingales, L. (1999). *What determines firm size?* Retrieved from

Kuntashula, E., & Mungatana, E. (2013). Estimating the causal effect of improved fallows on farmer welfare using robust identification strategies in Chongwe, Zambia. *Agroforestry systems, 87*(6), 1229-1246.

Lansberg, I. S. (1983). Managing human resources in family firms: The problem of institutional overlap. *Organizational dynamics, 12*(1), 39-46.

Levinson, H. (1971). CONFLICTS THAT PLAGUE FAMILY BUSINESSES. *Harvard Business Review, 49*(2), 90-&.

Lokshin, M., & Sajaia, Z. (2004). Maximum likelihood estimation of endogenous switching regression models. *Stata Journal, 4*, 282-289.

McConaughy, D. L., Matthews, C. H., & Fialko, A. S. (2001). Founding family controlled firms: Performance, risk, and value. *Journal of small business management, 39*(1), 31-49.

Miller, D., Le Breton-Miller, I., Lester, R. H., & Cannella, A. A. (2007). Are family firms really superior performers? *Journal of Corporate Finance, 13*(5), 829-858. doi:https://doi.org/10.1016/j.jcorpfin.2007.03.004

Mishra, C. S., & McConaughy, D. L. (1999). Founding family control and capital structure: The risk of loss of control and the aversion to debt. *Entrepreneurship theory and practice, 23*(4), 53-64.

Moskowitz, T. J., & Vissing-Jørgensen, A. (2002). The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle? *American Economic Review, 92*(4), 745-778.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*(2), 187-221. doi:https://doi.org/10.1016/0304-405X(84)90023-0

Naldi, L., Nordqvist, M., Sjöberg, K., & Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. *Family business review, 20*(1), 33-47.

Norges-Bank. (2017). Statsobligasjoner Årsgjennomsnitt. Retrieved from https://www.norges-bank.no/Statistikk/Rentestatistikk/Statsobligasjoner-Rente-Arsgjennomsnitt-av-daglige-noteringer/

Penman, S. H. (2013). *Financial Statement Analysis and Security Valuation* (5th ed.): McGraw Hill

Perez-Gonzalez, F. (2006). Inherited control and firm performance. *American Economic Review, 96*(5), 1559-1588. doi:10.1257/aer.96.5.1559

Pound, J. (1988). Proxy contests and the efficiency of shareholder oversight. *Journal of Financial Economics, 20*(Supplement C), 237-265. doi:https://doi.org/10.1016/0304-405X(88)90046-3

Poza, E. J. (2013). *Family business*: Cengage Learning.

Prabhala, N., & Li, K. (2007). Self-selection models in corporate finance. *Handbook of corporate finance: Empirical corporate finance, 1*, 37.

Pérez-González, F. (2006). Inherited control and firm performance. *American Economic Review, 96*(5), 1559-1588.

Rettab, B., & Azzam, A. (2011). Performance of Family and Non-family Firms with Self-Selection: Evidence from Dubai. *Modern Economy, 2*(04), 625.

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika, 70*(1), 41-55.

Sharpe, W. F. (1994). The sharpe ratio. *Journal of portfolio management, 21*(1), 49-58.

Shleifer, A., & Vishny, R. W. (1989). Management entrenchment: The case of manager-specific investments. *Journal of financial economics, 25*(1), 123-139.

Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *The journal of finance, 52*(2), 737-783.

Sraer, D., & Thesmar, D. (2007). Performance and behavior of family firms: Evidence from the French stock market. *Journal of the European Economic Association, 5*(4), 709-751. doi:10.1162/jeea.2007.5.4.709

SSB. (2008). Næringsstandard og Næringskoder. Retrieved from https://www.ssb.no/virksomheter-foretak-og-regnskap/naeringsstandard-og-naeringskoder

SSB. (2017). Nasjonalregnskap. Retrieved from https://www.ssb.no/statbank/table/09189/?rxid=9c48da98-2935-4d2b-aa7c-a3b7e7f4f994

SSB. (2018). Konsumprisindeksen. Retrieved from https://www.ssb.no/kpi

Stewart, W. H., Watson, W. E., Carland, J. C., & Carland, J. W. (1999). A proclivity for entrepreneurship: A comparison of entrepreneurs, small business owners, and corporate managers. *Journal of Business venturing, 14*(2), 189-214.

Stock, J. H., & Watson, M. W. (2015). *Introduction to Econometrics* (3 ed.): Pearson Education Limited.

Villalonga, B., & Amit, R. (2006). How do family ownership, control and management affect firm value? *Journal of Financial Economics, 80*(2), 385-417. doi:10.1016/j.jfineco.2004.12.005

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*: MIT press.

Appendix

Appendix 1 – CCGR Items

Discription	CCGR Data Item
Industry codes	item_11102
Herfindahl (based on direct ownership)	item_225
Number Of Owners (ultmate ownership)	item_14002
Largest family number of owners (ultmate ownership)	item_15307
Largest family sum ult ownership	item_15302
Largest family has CEO	item_15304
Revenue	item_9
Operating income	item_19
Other interest expenses	item_30
Net Income	item_39
Total fixed assets (tangible)	item_51
Total fixed assets	item_63
Total current assets	item_78
Total Assets	item_63+item_78
Total equity	item_87
Bonds	item_93
Liabilities to financial institutions	item_94
Liabilities to financial institutions	item_101
Account payable	item_102
Total Debt	item_93+94+101+102
ROA	(item_19+item_30)/(item_63+item_78)
Leverage	(item_93+94+101+102)/(item_63+78)
Company age	item_13420
Company Size	ln(item_9)
CEO birth year	item_13408
Extraction Filters	
Is Independent (ultmate ownership)	item_14507
Enterprise type	item_6

Table 18: The table presents the extracted items from the CCGR database

Appendix 2 – The Pooled Least Squares Model

Hill et al. (2013) defines the pooled model as following:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \cdots + \beta_K X_{K,it} + e_{it}\,, k = 1, \dots, K, i = 1, \dots, n, t = 1, \dots, T,$$

Where

1. $E(e_{it}) = 0$, error terms have zero mean
2. $Var(e_{it}) = E(e_{it}^2) = \sigma_{it}^2$, constant variance (homoskedasticity)
3. $Cov(e_{it}, e_{js}) = E(e_{it}, e_{js}) = 0$ for $i \neq j$ or $t \neq s$, are uncorrelated over time (t) and individuals (i)
4. $Cov(e_{it}, x_{kit}) = 0$, are uncorrelated with x_{kit}

Relax the assumptions when running the pooled model on panel data

1. $Cov(e_{it}, e_{it}) = Var(e_{it}) = \psi_{tt}$, when $t = s$
2. $Cov(e_{it}, e_{is}) = \psi_{ts}$
3. $Cov(e_{it}, e_{js}) = 0$ for $i \neq j$

Appendix 3 – The Fixed Effects Model

Stock and Watson (2015, p. 412) describe the fixed effects model as following:

$$Y_{it} = \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_K X_{Kit} + \alpha_i + u_{it}\,, k = 1, \dots, K, i = 1, \dots, n, t = 1, \dots, T,$$

Where

1. u_{it} has conditional mean zero: $E(u_{it} | X_{i1}, X_{i2}, \dots, X_{iT}, \alpha_i) = 0$
2. $(X_{i1}, X_{i2}, \dots, X_{iT}, u_{i1}, u_{i2}, \dots, u_{iT}), i = 1, \dots, n$ are i.i.d. draws from their joint distribution.
3. Large outliers are unlikely: (X_{it}, u_{it}) have nonzero finite fourth moments.
4. There is no perfect multicollinearity.

Appendix 4 – Descriptive Statistics of the Main Sample

Main sample

Year		roa	revenue	net income	volatilty revenue	leverage	risk-return	# owners	herfindahl	equity	total assets	tangibility	asset intensity	total debt	company age	age ceo	company size
2000	*mean*	0,099	10 300 000	440 151	,	0,314	0,537	2,80	0,60	1 612 042	5 226 483	0,230	14,712	1 745 388	8,812	46,398	15,459
	median	0,097	4 753 438	164 300	,	0,248	0,332	2,00	0,50	498 200	2 367 775	0,132	14,677	524 700	7,000	46,000	15,427
	standard deviation	0,178	22 200 000	2 444 609	,	0,386	1,417	4,54	0,28	9 273 960	14 600 000	0,247	1,163	5 033 411	9,868	10,727	1,204
	observations	17 892	17 892	17 892	,	17 892	17 892	17 892	17 892	17 892	17 892	17 892	17 892	17 892	17 892	17 892	17 285
2001	*mean*	0,095	10 600 000	399 073	,	0,313	0,535	2,78	0,60	1 568 268	5 507 087	0,227	14,765	1 874 424	9,622	47,145	15,502
	median	0,097	4 917 627	164 736	,	0,238	0,357	2,00	0,50	465 894	2 486 484	0,130	14,726	519 948	7,000	47,000	15,447
	standard deviation	0,184	24 400 000	1 755 638	,	0,398	1,389	3,97	0,28	10 700 000	17 500 000	0,246	1,149	6 669 512	9,799	10,703	1,175
	observations	19 363	19 363	19 363	,	19 363	19 363	19 363	19 363	19 363	19 363	19 363	19 363	19 363	19 363	19 363	18 787
2002	*mean*	0,100	11 000 000	449 056	,	0,310	0,609	2,71	0,60	1 454 646	5 808 677	0,223	14,797	1 942 699	10,626	48,120	15,538
	median	0,103	5 054 132	186 837	,	0,230	0,444	2,00	0,50	414 346	2 558 523	0,122	14,755	523 652	8,000	48,000	15,478
	standard deviation	0,193	25 600 000	3 622 940	,	0,590	1,431	2,99	0,29	11 500 000	20 000 000	0,247	1,151	7 229 018	9,799	10,687	1,168
	observations	19 762	19 762	19 762	,	19 762	19 762	19 762	19 762	19 762	19 762	19 762	19 762	19 762	19 762	19 762	19 174
2003	*mean*	0,082	10 300 000	389 034	0,261	0,325	0,762	2,70	0,60	1 233 079	5 504 867	0,217	14,696	1 967 559	9,635	46,857	15,426
	median	0,092	4 506 243	149 919	0,153	0,241	0,572	2,00	0,50	339 486	2 284 097	0,113	14,641	493 122	7,000	47,000	15,378
	standard deviation	0,222	24 900 000	2 207 011	0,325	0,561	1,546	2,73	0,29	10 500 000	20 500 000	0,249	1,173	8 229 020	9,799	10,488	1,220
	observations	25 336	25 336	25 336	17 532	25 336	25 336	25 336	25 336	25 336	25 336	25 336	25 336	25 336	25 336	25 336	24 455
2004	*mean*	0,098	11 300 000	530 300	0,250	0,323	1,014	2,69	0,60	1 194 180	5 936 176	0,206	14,766	2 050 768	10,089	47,299	15,520
	median	0,103	4 905 420	207 480	0,147	0,240	0,848	2,00	0,50	313 690	2 437 890	0,104	14,707	526 110	8,000	47,000	15,449
	standard deviation	0,220	29 700 000	3 738 853	0,321	0,584	1,559	2,61	0,29	11 100 000	25 800 000	0,242	1,165	8 164 223	9,836	10,265	1,193
	observations	24 693	24 693	24 693	16 913	24 693	24 693	24 693	24 693	24 693	24 693	24 693	24 693	24 693	24 693	24 693	23 919
2005	*mean*	0,089	10 000 000	482 493	0,252	0,337	0,870	2,74	0,59	1 382 311	5 306 952	0,202	14,660	1 942 470	9,601	47,128	15,393
	median	0,092	4 356 990	161 595	0,146	0,252	0,663	2,00	0,50	466 560	2 163 915	0,099	14,587	495 720	7,000	47,000	15,331
	standard deviation	0,230	28 700 000	3 551 819	0,334	0,603	1,533	2,85	0,29	8 593 585	17 700 000	0,242	1,162	7 287 780	9,860	10,388	1,192
	observations	23 919	23 919	23 919	14 010	23 919	23 919	23 919	23 919	23 919	23 919	23 919	23 919	23 919	23 919	23 919	23 226
2006	*mean*	0,088	11 300 000	564 260	0,282	0,321	0,739	2,60	0,61	1 785 066	6 171 961	0,190	14,808	2 203 361	9,994	47,662	15,509
	median	0,093	4 895 688	199 640	0,179	0,240	0,586	2,00	0,50	601 496	2 539 936	0,087	14,748	546 112	8,000	47,000	15,440
	standard deviation	0,224	34 700 000	3 456 199	0,317	0,346	1,427	2,73	0,28	14 100 000	24 300 000	0,236	1,150	9 812 627	9,867	10,393	1,187
	observations	22 711	22 711	22 711	16 364	22 711	22 711	22 711	22 711	22 711	22 711	22 711	22 711	22 711	22 711	22 711	22 121
2007	*mean*	0,107	10 100 000	557 125	0,259	0,292	0,752	2,63	0,62	1 772 136	5 722 912	0,189	14,746	1 923 985	9,131	47,360	15,416
	median	0,110	4 496 117	218 115	0,166	0,202	0,603	2,00	0,50	622 512	2 395 728	0,085	14,689	440 357	6,000	47,000	15,357
	standard deviation	0,213	29 500 000	7 207 694	0,297	0,306	1,419	3,00	0,30	16 000 000	23 900 000	0,236	1,135	8 981 730	9,797	10,507	1,188
	observations	24 938	24 938	24 938	15 222	24 938	24 938	24 938	24 938	24 938	24 938	24 938	24 938	24 938	24 938	24 938	24 263
2008	*mean*	0,080	9 825 022	378 341	0,254	0,290	0,614	2,59	0,64	1 962 531	5 823 562	0,195	14,726	1 941 988	9,143	47,505	15,402
	median	0,092	4 382 688	157 904	0,163	0,189	0,457	2,00	0,50	648 656	2 357 200	0,090	14,673	391 920	6,000	47,000	15,334
	standard deviation	0,234	24 800 000	3 903 936	0,289	0,317	1,484	3,01	0,30	30 000 000	46 700 000	0,240	1,138	11 600 000	9,800	10,559	1,181
	observations	25 857	25 857	25 857	16 471	25 857	25 857	25 857	25 857	25 857	25 857	25 857	25 857	25 857	25 857	25 857	25 157
2009	*mean*	0,071	9 065 193	360 615	0,234	0,283	0,721	2,57	0,65	1 905 527	5 551 703	0,194	14,704	1 894 472	9,364	47,783	15,323
	median	0,081	4 092 160	140 112	0,144	0,179	0,545	2,00	0,51	667 200	2 299 616	0,089	14,648	363 624	6,000	47,000	15,262
	standard deviation	0,226	22 200 000	4 385 394	0,293	0,330	1,464	3,20	0,30	14 500 000	29 300 000	0,241	1,132	18 000 000	9,759	10,603	1,179
	observations	26 305	26 305	26 305	16 250	26 305	26 305	26 305	26 305	26 305	26 305	26 305	26 305	26 305	26 305	26 305	25 598
2010	*mean*	0,067	8 935 045	372 243	0,247	0,280	0,714	2,53	0,66	1 918 520	5 474 611	0,192	14,686	1 876 032	9,447	47,995	15,302
	median	0,075	4 018 200	133 578	0,153	0,173	0,519	2,00	0,52	659 202	2 265 396	0,086	14,633	343 176	6,000	48,000	15,243
	standard deviation	0,228	22 700 000	1 761 943	0,298	0,343	1,453	3,13	0,30	15 300 000	30 800 000	0,240	1,138	20 200 000	9,778	10,659	1,174
	observations	27 193	27 193	27 193	19 036	27 193	27 193	27 193	27 193	27 193	27 193	27 193	27 193	27 193	27 193	27 193	26 518
2011	*mean*	0,075	9 116 722	357 265	0,245	0,278	0,788	2,49	0,67	1 876 725	5 484 887	0,188	14,701	1 898 617	9,539	48,187	15,311
	median	0,083	4 092 360	154 368	0,153	0,175	0,612	2,00	0,54	664 640	2 300 512	0,084	14,649	346 256	6,000	48,000	15,260
	standard deviation	0,221	23 100 000	6 604 940	0,295	0,329	1,456	3,06	0,30	9 091 031	25 800 000	0,237	1,147	18 900 000	9,777	10,715	1,188
	observations	28 138	28 138	28 138	19 874	28 138	28 138	28 138	28 138	28 138	28 138	28 138	28 138	28 138	28 138	28 138	27 457
2012	*mean*	0,081	8 881 957	396 824	0,244	0,264	0,926	3,49	0,68	1 877 002	5 205 902	0,187	14,633	1 685 981	9,209	48,175	15,266
	median	0,087	3 862 755	152 295	0,152	0,157	0,728	2,00	0,56	631 545	2 163 015	0,080	14,587	289 680	6,000	48,000	15,200
	standard deviation	0,235	21 000 000	4 115 697	0,291	0,339	1,509	14,42	0,30	9 888 847	19 300 000	0,238	1,192	10 000 000	9,846	10,833	1,200
	observations	29 955	29 955	29 955	19 964	29 955	29 955	29 955	29 955	29 955	29 955	29 955	29 955	29 955	29 955	29 955	29 254
2013	*mean*	0,071	8 462 273	396 291	0,246	0,260	0,844	3,17	0,69	1 852 315	5 038 093	0,184	14,561	1 619 080	9,059	48,304	15,209
	median	0,081	3 601 479	130 375	0,151	0,147	0,654	2,00	0,63	595 553	2 003 603	0,077	14,510	253 449	6,000	48,000	15,129
	standard deviation	0,247	21 200 000	2 910 484	0,292	0,472	1,527	11,97	0,30	10 500 000	21 100 000	0,236	1,208	10 700 000	9,802	10,929	1,195
	observations	31 597	31 597	31 597	20 541	31 597	31 597	31 597	31 597	31 597	31 597	31 597	31 597	31 597	31 597	31 597	30 869
2014	*mean*	0,078	8 091 000	380 085	0,243	0,251	0,924	2,82	0,71	1 837 227	4 794 734	0,183	14,521	1 475 785	9,025	48,390	15,187
	median	0,086	3 494 883	134 772	0,146	0,142	0,712	2,00	0,74	580 949	1 911 312	0,077	14,463	234 830	6,000	48,000	15,094
	standard deviation	0,242	19 800 000	2 075 602	0,298	0,345	1,559	8,10	0,30	10 200 000	17 800 000	0,242	1,200	9 299 794	9,783	10,941	1,164
	observations	30 750	30 750	30 750	19 488	30 750	30 750	30 750	30 750	30 750	30 750	30 750	30 750	30 750	30 750	30 750	30 145
2015	*mean*	0,068	8 464 261	378 604	0,249	0,248	0,954	2,70	0,71	1 950 836	5 021 527	0,183	14,561	1 551 153	10,019	49,253	15,228
	median	0,080	3 642 000	131 000	0,152	0,139	0,736	2,00	0,78	648 000	1 973 000	0,076	14,495	243 000	7,000	49,000	15,140
	standard deviation	0,240	21 400 000	1 955 386	0,296	0,319	1,606	7,59	0,30	11 100 000	19 300 000	0,239	1,192	10 200 000	9,851	10,928	1,187
	observations	28 197	28 197	28 197	20 888	28 197	28 197	28 197	28 197	28 197	28 197	28 197	28 197	28 197	28 197	28 197	27 555
Total	*mean*	0,083	9 610 662	422 750	0,251	0,290	0,784	2,76	0,64	1 718 090	5 447 043	0,197	14,681	1 835 077	9,497	47,791	15,359
	median	0,090	4 216 511	158 556	0,154	0,193	0,599	2,00	0,52	540 828	2 254 136	0,093	14,628	383 267	7,000	47,000	15,292
	standard deviation	0,225	24 800 000	3 838 849	0,303	0,420	1,500	6,51	0,30	13 600 000	24 800 000	0,241	1,167	11 800 000	9,822	10,681	1,193
	observations	406 606	406 606	406 606	232 553	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	406 606	395 783

Table 19: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the main sample for all firm types on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Entrepreneurial family firm

Year		roa	revenue	net income	volatilty revenue	leverage	risk-return	# owners	herfindahl	equity	total assets	tangibility	asset intensity	total debt	company age	age ceo	company size
2000	*mean*	0,088	9 477 221	261 932	,	0,351	0,461	1,00	1,00	682 071	3 384 373	0,234	14,446	1 383 623	4,592	44,444	15,318
	median	0,094	3 900 138	124 550	,	0,298	0,299	1,00	1,00	304 750	1 859 638	0,139	14,436	495 550	4,000	44,000	15,221
	standard deviation	0,169	15 900 000	721 167	,	0,293	1,348	0,00	0,00	1 741 575	5 604 511	0,248	1,085	3 225 828	3,042	9,231	1,258
	observations	3 076	3 076	3 076	,	3 076	3 076	3 076	3 076	3 076	3 076	3 076	3 076	3 076	3 076	3 076	2 976
2001	*mean*	0,083	9 145 154	236 626	,	0,347	0,491	1,00	1,00	535 507	3 184 313	0,232	14,430	1 271 932	5,040	44,862	15,324
	median	0,097	3 903 471	120 978	,	0,285	0,339	1,00	1,00	275 418	1 857 141	0,138	14,435	453 024	5,000	44,000	15,207
	standard deviation	0,194	15 000 000	657 227	,	0,306	1,385	0,00	0,00	1 175 438	4 362 183	0,246	1,061	2 560 657	2,738	9,373	1,204
	observations	3 159	3 159	3 159	,	3 159	3 159	3 159	3 159	3 159	3 159	3 159	3 159	3 159	3 159	3 159	3 069
2002	*mean*	0,093	9 271 233	287 457	,	0,351	0,621	1,00	1,00	479 732	3 310 026	0,231	14,469	1 311 273	5,606	45,404	15,353
	median	0,109	4 059 574	142 352	,	0,285	0,456	1,00	1,00	260 555	1 910 313	0,130	14,463	479 167	5,000	45,000	15,245
	standard deviation	0,202	15 400 000	736 914	,	0,325	1,410	0,00	0,00	1 268 645	4 962 591	0,250	1,048	2 846 638	2,419	9,413	1,176
	observations	2 965	2 965	2 965	,	2 965	2 965	2 965	2 965	2 965	2 965	2 965	2 965	2 965	2 965	2 965	2 890
2003	*mean*	0,068	8 445 475	219 049	0,279	0,367	0,713	1,00	1,00	386 366	3 013 091	0,225	14,348	1 259 625	4,646	44,358	15,217
	median	0,094	3 502 653	110 271	0,168	0,291	0,520	1,00	1,00	220 542	1 659 021	0,127	14,322	416 304	5,000	44,000	15,115
	standard deviation	0,244	14 400 000	678 584	0,328	0,373	1,536	0,00	0,00	1 198 375	4 756 658	0,249	1,047	2 824 956	2,973	9,477	1,215
	observations	4 093	4 093	4 093	2 418	4 093	4 093	4 093	4 093	4 093	4 093	4 093	4 093	4 093	4 093	4 093	3 986
2004	*mean*	0,088	8 694 837	288 343	0,262	0,360	0,904	1,00	1,00	356 449	3 081 022	0,213	14,392	1 225 876	4,908	44,661	15,288
	median	0,101	3 756 870	143 260	0,163	0,282	0,753	1,00	1,00	200 070	1 701 830	0,116	14,347	424 223	5,000	44,000	15,168
	standard deviation	0,231	14 100 000	811 711	0,307	0,386	1,515	0,00	0,00	1 628 463	4 670 757	0,240	1,025	2 805 689	2,872	9,438	1,178
	observations	3 984	3 984	3 984	2 218	3 984	3 984	3 984	3 984	3 984	3 984	3 984	3 984	3 984	3 984	3 984	3 895
2005	*mean*	0,093	7 527 560	259 644	0,257	0,352	0,852	1,00	1,00	554 110	2 678 311	0,203	14,282	1 077 727	4,248	44,576	15,138
	median	0,096	3 184 515	130 005	0,157	0,266	0,645	1,00	1,00	325 620	1 487 160	0,100	14,212	355 995	4,000	44,000	14,999
	standard deviation	0,244	12 900 000	718 373	0,315	0,355	1,570	0,00	0,00	1 794 917	4 010 425	0,238	0,988	2 184 267	3,078	9,650	1,134
	observations	4 037	4 037	4 037	1 553	4 037	4 037	4 037	4 037	4 037	4 037	4 037	4 037	4 037	4 037	4 037	3 952
2006	*mean*	0,095	8 332 531	313 262	0,283	0,333	0,761	1,00	1,00	756 058	3 062 998	0,188	14,452	1 168 895	4,350	45,070	15,253
	median	0,103	3 595 452	169 372	0,187	0,244	0,591	1,00	1,00	441 784	1 816 080	0,090	14,412	378 672	4,000	44,000	15,112
	standard deviation	0,247	14 700 000	693 963	0,294	0,371	1,447	0,00	0,00	2 106 072	4 302 031	0,230	0,959	2 255 344	3,005	9,595	1,099
	observations	3 912	3 912	3 912	2 153	3 912	3 912	3 912	3 912	3 912	3 912	3 912	3 912	3 912	3 912	3 912	3 840
2007	*mean*	0,124	6 932 135	353 435	0,258	0,287	0,820	1,00	1,00	832 879	2 901 726	0,184	14,390	993 237	3,492	44,731	15,089
	median	0,127	3 137 319	195 714	0,174	0,187	0,663	1,00	1,00	454 505	1 729 593	0,083	14,363	265 275	2,000	44,000	14,987
	standard deviation	0,221	12 100 000	783 657	0,272	0,315	1,450	0,00	0,00	2 003 390	4 206 903	0,230	0,968	2 188 616	3,034	9,594	1,121
	observations	5 686	5 686	5 686	2 110	5 686	5 686	5 686	5 686	5 686	5 686	5 686	5 686	5 686	5 686	5 686	5 573
2008	*mean*	0,091	6 890 605	277 256	0,266	0,286	0,693	1,00	1,00	875 285	2 865 051	0,187	14,365	955 519	3,480	44,930	15,088
	median	0,105	3 045 048	138 592	0,185	0,171	0,530	1,00	1,00	457 808	1 680 712	0,090	14,335	240 832	3,000	44,000	14,956
	standard deviation	0,261	12 300 000	822 345	0,276	0,336	1,545	0,00	0,00	1 737 676	3 945 091	0,232	0,982	2 219 441	2,875	9,737	1,092
	observations	6 392	6 392	6 392	2 570	6 392	6 392	6 392	6 392	6 392	6 392	6 392	6 392	6 392	6 392	6 392	6 259
2009	*mean*	0,090	6 613 384	283 144	0,243	0,282	0,847	1,00	1,00	919 986	2 829 833	0,184	14,346	918 609	3,553	45,094	15,013
	median	0,101	2 902 320	138 444	0,156	0,160	0,661	1,00	1,00	458 700	1 651 320	0,085	14,317	213 504	3,000	44,000	14,898
	standard deviation	0,255	12 500 000	716 161	0,279	0,359	1,530	0,00	0,00	1 843 540	3 995 695	0,229	0,984	2 182 302	2,601	9,695	1,114
	observations	6 628	6 628	6 628	2 488	6 628	6 628	6 628	6 628	6 628	6 628	6 628	6 628	6 628	6 628	6 628	6 521
2010	*mean*	0,086	6 424 352	271 627	0,262	0,277	0,839	1,00	1,00	956 292	2 827 279	0,183	14,340	896 437	3,799	45,396	14,995
	median	0,097	2 838 261	132 492	0,172	0,151	0,624	1,00	1,00	450 690	1 622 484	0,083	14,299	206 340	3,000	45,000	14,875
	standard deviation	0,247	12 200 000	666 326	0,286	0,393	1,542	0,00	0,00	2 373 206	4 124 361	0,229	0,993	2 154 004	2,682	9,768	1,082
	observations	7 270	7 270	7 270	4 013	7 270	7 270	7 270	7 270	7 270	7 270	7 270	7 270	7 270	7 270	7 270	7 163
2011	*mean*	0,091	6 413 391	279 053	0,260	0,272	0,872	1,00	1,00	958 767	2 851 720	0,181	14,346	900 841	3,927	45,606	14,995
	median	0,099	2 851 520	137 216	0,172	0,156	0,656	1,00	1,00	449 168	1 649 808	0,086	14,316	207 968	4,000	45,000	14,882
	standard deviation	0,239	12 100 000	774 172	0,282	0,334	1,530	0,00	0,00	2 121 316	4 005 116	0,227	1,003	2 196 160	2,733	9,824	1,103
	observations	7 915	7 915	7 915	4 572	7 915	7 915	7 915	7 915	7 915	7 915	7 915	7 915	7 915	7 915	7 915	7 796
2012	*mean*	0,105	6 009 497	302 624	0,261	0,254	1,046	1,00	1,00	939 855	2 701 811	0,182	14,235	822 186	3,661	45,526	14,928
	median	0,111	2 682 735	140 580	0,175	0,134	0,845	1,00	1,00	407 895	1 460 115	0,082	14,194	159 750	3,000	45,000	14,820
	standard deviation	0,256	11 800 000	726 238	0,274	0,326	1,575	0,00	0,00	2 433 197	4 495 628	0,229	1,067	2 603 600	2,943	10,025	1,096
	observations	9 167	9 167	9 167	4 687	9 167	9 167	9 167	9 167	9 167	9 167	9 167	9 167	9 167	9 167	9 167	9 013
2013	*mean*	0,089	5 687 663	275 797	0,266	0,253	0,973	1,00	1,00	923 647	2 595 248	0,180	14,174	772 834	3,615	45,727	14,895
	median	0,102	2 611 672	120 988	0,177	0,122	0,758	1,00	1,00	370 265	1 359 029	0,081	14,122	139 762	3,000	45,000	14,790
	standard deviation	0,282	11 600 000	814 142	0,283	0,671	1,631	0,00	0,00	2 098 313	4 384 277	0,227	1,071	2 753 325	2,945	10,123	1,061
	observations	10 495	10 495	10 495	4 992	10 495	10 495	10 495	10 495	10 495	10 495	10 495	10 495	10 495	10 495	10 495	10 351
2014	*mean*	0,094	5 422 757	292 261	0,266	0,243	1,054	1,00	1,00	947 795	2 494 443	0,180	14,138	688 122	3,733	45,879	14,886
	median	0,110	2 525 954	124 562	0,171	0,124	0,816	1,00	1,00	361 434	1 302 796	0,081	14,080	129 667	3,000	46,000	14,755
	standard deviation	0,278	11 000 000	1 444 267	0,293	0,392	1,669	0,00	0,00	2 739 235	4 346 879	0,228	1,062	2 184 254	2,948	10,116	1,006
	observations	10 945	10 945	10 945	5 004	10 945	10 945	10 945	10 945	10 945	10 945	10 945	10 945	10 945	10 945	10 945	10 800
2015	*mean*	0,079	5 783 950	273 268	0,275	0,244	1,043	1,00	1,00	1 027 337	2 646 921	0,185	14,200	742 276	4,503	46,664	14,924
	median	0,095	2 622 000	120 000	0,183	0,124	0,794	1,00	1,00	429 000	1 386 500	0,086	14,142	142 000	4,000	46,000	14,795
	standard deviation	0,269	11 900 000	730 467	0,288	0,343	1,693	0,00	0,00	2 584 632	4 186 088	0,241	1,059	2 097 476	2,786	10,124	1,058
	observations	9 722	9 722	9 722	5 951	9 722	9 722	9 722	9 722	9 722	9 722	9 722	9 722	9 722	9 722	9 722	9 560
Total	*mean*	0,091	6 765 983	282 471	0,265	0,285	0,874	1,00	1,00	835 107	2 809 767	0,191	14,297	935 300	4,021	45,384	15,039
	median	0,103	2 932 996	133 848	0,174	0,174	0,672	1,00	1,00	375 945	1 563 625	0,093	14,263	223 716	3,000	45,000	14,912
	standard deviation	0,252	12 700 000	851 494	0,289	0,400	1,568	0,00	0,00	2 145 460	4 338 761	0,234	1,034	2 420 533	2,911	9,836	1,112
	observations	99 446	99 446	99 446	44 729	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	99 446	97 644

Table 20: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the entrepreneurial family firms on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Year		roa	revenue	net income	revenue	leverage	ratio	# owners	herfindahl	equity	total assets	tangibility	intensity	age	age ceo	size
2000	*mean*	0,099	9 811 818	392 801	,	0,280	0,499	1,00	1,00	1 528 308	4 901 676	0,231	14,786	17,126	50,797	15,496
	median	0,095	5 099 925	176 225	,	0,219	0,324	1,00	1,00	612 150	2 642 050	0,148	14,787	14,000	51,000	15,488
	standard deviation	0,129	17 000 000	1 182 886	,	0,246	1,298	0,00	0,00	3 393 817	9 301 969	0,232	1,084	10,006	8,966	1,152
	observations	1 555	1 555	1 555	,	1 555	1 555	1 555	1 555	1 555	1 555	1 555	1 555	1 555	1 555	1 511
2001	*mean*	0,092	10 100 000	356 760	,	0,281	0,503	1,00	1,00	1 334 219	4 948 234	0,224	14,792	17,265	51,309	15,491
	median	0,097	4 995 491	176 963	,	0,204	0,391	1,00	1,00	537 966	2 581 079	0,143	14,764	14,000	51,000	15,464
	standard deviation	0,166	18 100 000	906 405	,	0,272	1,286	0,00	0,00	2 989 044	9 383 649	0,233	1,077	9,937	9,020	1,171
	observations	1 940	1 940	1 940	,	1 940	1 940	1 940	1 940	1 940	1 940	1 940	1 940	1 940	1 940	1 887
2002	*mean*	0,099	10 200 000	384 118	,	0,278	0,561	1,00	1,00	1 087 652	4 869 616	0,221	14,767	17,477	52,103	15,460
	median	0,099	4 698 887	179 211	,	0,203	0,410	1,00	1,00	415 617	2 573 775	0,129	14,761	15,000	52,000	15,412
	standard deviation	0,149	18 600 000	883 474	,	0,303	1,313	0,00	0,00	2 908 882	9 326 013	0,240	1,092	9,536	9,662	1,210
	observations	2 249	2 249	2 249	,	2 249	2 249	2 249	2 249	2 249	2 249	2 249	2 249	2 249	2 249	2 174
2003	*mean*	0,091	10 300 000	388 163	0,237	0,288	0,815	1,00	1,00	958 444	4 742 224	0,219	14,754	17,917	51,564	15,466
	median	0,095	4 615 275	170 982	0,135	0,208	0,655	1,00	1,00	387 807	2 511 453	0,122	14,736	15,000	52,000	15,403
	standard deviation	0,179	18 500 000	934 167	0,317	0,326	1,482	0,00	0,00	2 647 014	8 043 736	0,240	1,092	9,517	8,944	1,214
	observations	2 463	2 463	2 463	2 186	2 463	2 463	2 463	2 463	2 463	2 463	2 463	2 463	2 463	2 463	2 364
2004	*mean*	0,104	10 700 000	488 422	0,249	0,296	1,087	1,00	1,00	820 529	4 936 403	0,209	14,789	18,147	51,949	15,496
	median	0,105	4 713 995	226 005	0,132	0,211	0,939	1,00	1,00	332 215	2 612 025	0,112	14,776	16,000	52,000	15,442
	standard deviation	0,178	18 100 000	1 112 068	0,348	0,484	1,526	0,00	0,00	2 477 546	8 081 042	0,238	1,101	9,391	8,894	1,251
	observations	2 563	2 563	2 563	2 374	2 563	2 563	2 563	2 563	2 563	2 563	2 563	2 563	2 563	2 563	2 455
2005	*mean*	0,105	8 167 043	398 378	0,262	0,316	0,947	1,00	1,00	1 037 098	4 107 500	0,208	14,621	18,450	52,364	15,287
	median	0,095	3 975 480	162 810	0,139	0,218	0,722	1,00	1,00	488 430	2 178 495	0,111	14,594	16,000	53,000	15,239
	standard deviation	0,207	12 600 000	1 048 616	0,366	0,889	1,497	0,00	0,00	2 639 949	7 342 720	0,242	1,073	9,495	8,921	1,183
	observations	2 205	2 205	2 205	2 047	2 205	2 205	2 205	2 205	2 205	2 205	2 205	2 205	2 205	2 205	2 126
2006	*mean*	0,103	8 696 837	445 980	0,266	0,292	0,778	1,00	1,00	1 316 091	4 449 093	0,204	14,737	18,725	52,940	15,348
	median	0,096	4 245 248	197 064	0,158	0,204	0,631	1,00	1,00	645 288	2 404 696	0,102	14,693	17,000	54,000	15,297
	standard deviation	0,185	13 600 000	997 029	0,340	0,354	1,364	0,00	0,00	2 952 560	6 747 400	0,244	1,053	9,385	8,837	1,198
	observations	2 180	2 180	2 180	2 074	2 180	2 180	2 180	2 180	2 180	2 180	2 180	2 180	2 180	2 180	2 108
2007	*mean*	0,124	8 197 129	507 617	0,263	0,252	0,843	1,00	1,00	1 538 895	4 315 174	0,194	14,720	18,756	53,128	15,281
	median	0,118	4 033 359	242 874	0,151	0,164	0,693	1,00	1,00	753 381	2 403 981	0,093	14,693	17,000	54,000	15,264
	standard deviation	0,178	13 000 000	1 010 320	0,338	0,299	1,349	0,00	0,00	3 205 797	6 465 029	0,237	1,042	9,073	8,906	1,205
	observations	2 378	2 378	2 378	2 249	2 378	2 378	2 378	2 378	2 378	2 378	2 378	2 378	2 378	2 378	2 301
2008	*mean*	0,090	8 213 172	358 004	0,239	0,248	0,636	1,00	1,00	1 631 962	4 239 843	0,194	14,721	18,829	53,220	15,259
	median	0,093	3 834 000	170 400	0,143	0,153	0,518	1,00	1,00	814 512	2 414 000	0,087	14,697	17,000	54,000	15,205
	standard deviation	0,189	13 600 000	935 484	0,293	0,285	1,397	0,00	0,00	3 251 030	5 939 110	0,238	1,028	9,025	8,915	1,215
	observations	2 553	2 553	2 553	2 432	2 553	2 553	2 553	2 553	2 553	2 553	2 553	2 553	2 553	2 553	2 466
2009	*mean*	0,088	7 743 018	365 420	0,236	0,232	0,774	1,00	1,00	1 778 795	4 238 175	0,195	14,720	18,657	53,449	15,179
	median	0,088	3 534 492	170 136	0,137	0,131	0,649	1,00	1,00	875 144	2 398 584	0,092	14,690	17,000	54,000	15,131
	standard deviation	0,171	13 700 000	833 907	0,306	0,272	1,372	0,00	0,00	3 365 038	5 782 968	0,240	1,029	8,805	8,887	1,206
	observations	2 822	2 822	2 822	2 679	2 822	2 822	2 822	2 822	2 822	2 822	2 822	2 822	2 822	2 822	2 732
2010	*mean*	0,079	7 682 459	328 633	0,236	0,233	0,690	1,00	1,00	1 855 903	4 295 080	0,196	14,738	19,138	53,942	15,176
	median	0,076	3 508 866	150 954	0,139	0,127	0,551	1,00	1,00	905 724	2 501 058	0,089	14,732	17,000	54,000	15,123
	standard deviation	0,166	13 600 000	743 905	0,304	0,284	1,325	0,00	0,00	3 162 782	5 675 536	0,240	1,033	8,737	8,838	1,192
	observations	2 892	2 892	2 892	2 777	2 892	2 892	2 892	2 892	2 892	2 892	2 892	2 892	2 892	2 892	2 802
2011	*mean*	0,085	7 798 472	345 524	0,239	0,226	0,762	1,00	1,00	2 000 441	4 419 928	0,190	14,758	19,304	54,324	15,172
	median	0,083	3 540 816	169 376	0,137	0,124	0,636	1,00	1,00	958 368	2 550 288	0,084	14,752	17,000	55,000	15,121
	standard deviation	0,166	14 000 000	891 349	0,311	0,312	1,338	0,00	0,00	3 487 120	6 072 066	0,235	1,040	8,759	9,010	1,223
	observations	3 077	3 077	3 077	2 951	3 077	3 077	3 077	3 077	3 077	3 077	3 077	3 077	3 077	3 077	2 982
2012	*mean*	0,087	8 164 071	402 077	0,233	0,211	0,891	1,00	1,00	2 157 656	4 579 547	0,186	14,777	19,623	54,626	15,178
	median	0,087	3 522 488	176 790	0,133	0,106	0,728	1,00	1,00	1 016 010	2 617 770	0,078	14,778	17,000	55,000	15,104
	standard deviation	0,171	14 800 000	838 429	0,304	0,274	1,354	0,00	0,00	3 924 827	6 425 748	0,234	1,055	8,949	9,015	1,245
	observations	3 142	3 142	3 142	3 018	3 142	3 142	3 142	3 142	3 142	3 142	3 142	3 142	3 142	3 142	3 036
2013	*mean*	0,081	7 816 699	378 523	0,240	0,207	0,803	1,00	1,00	2 245 419	4 578 611	0,183	14,744	19,795	54,767	15,123
	median	0,078	3 352 202	173 138	0,136	0,101	0,666	1,00	1,00	1 031 527	2 514 673	0,079	14,738	18,000	55,000	15,080
	standard deviation	0,176	14 500 000	788 285	0,311	0,293	1,357	0,00	0,00	4 639 468	7 907 091	0,231	1,080	9,017	9,204	1,273
	observations	3 339	3 339	3 339	3 223	3 339	3 339	3 339	3 339	3 339	3 339	3 339	3 339	3 339	3 339	3 202
2014	*mean*	0,082	7 478 170	386 426	0,241	0,198	0,808	1,00	1,00	2 317 572	4 447 008	0,178	14,720	19,970	54,927	15,079
	median	0,080	3 261 074	157 745	0,137	0,095	0,660	1,00	1,00	1 042 441	2 470 820	0,072	14,720	18,000	55,000	15,057
	standard deviation	0,167	14 000 000	1 006 693	0,319	0,280	1,332	0,00	0,00	4 897 841	6 850 966	0,281	1,080	8,981	9,255	1,296
	observations	3 288	3 288	3 288	3 181	3 288	3 288	3 288	3 288	3 288	3 288	3 288	3 288	3 288	3 288	3 167
2015	*mean*	0,079	7 435 685	385 306	0,242	0,192	0,892	1,00	1,00	2 312 545	4 466 781	0,173	14,682	20,069	55,341	15,054
	median	0,078	3 217 500	146 000	0,138	0,089	0,706	1,00	1,00	1 006 500	2 352 500	0,067	14,671	18,000	56,000	15,040
	standard deviation	0,175	14 000 000	1 423 867	0,315	0,251	1,455	0,00	0,00	5 334 787	7 661 479	0,229	1,116	9,127	9,319	1,323
	observations	3 354	3 354	3 354	3 251	3 354	3 354	3 354	3 354	3 354	3 354	3 354	3 354	3 354	3 354	3 207
Total	*mean*	0,091	8 512 693	392 413	0,244	0,245	0,783	1,00	1,00	1 691 717	4 514 507	0,197	14,737	18,866	53,420	15,258
	median	0,090	3 848 370	175 938	0,139	0,148	0,631	1,00	1,00	728 664	2 468 599	0,096	14,719	16,000	54,000	15,212
	standard deviation	0,174	15 100 000	983 130	0,320	0,363	1,388	0,00	0,00	3 703 752	7 282 880	0,241	1,068	9,219	9,145	1,239
	observations	42 000	42 000	42 000	34 442	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	42 000	40 520

Table 21: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the single owner family firms on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Year		roa	revenue	net income	revenue	leverage	return	# owners	herfindahl	equity	total assets	tangibility	intensity	total debt	age	age ceo	size
2000	*mean*	0,115	9 692 236	457 737	,	0,303	0,645	2,88	0,49	1 594 813	5 062 552	0,238	14,735	1 696 493	9,152	46,865	15,440
	median	0,103	4 701 763	188 150	,	0,232	0,427	2,00	0,50	540 600	2 406 863	0,142	14,694	514 763	7,000	47,000	15,411
	standard deviation	0,173	19 300 000	1 357 385	,	0,491	1,433	3,01	0,14	6 301 835	11 000 000	0,249	1,133	4 509 547	10,554	10,569	1,164
	observations	7 332	7 332	7 332	,	7 332	7 332	7 332	7 332	7 332	7 332	7 332	7 332	7 332	7 332	7 332	7 123
2001	*mean*	0,105	9 908 605	444 080	,	0,300	0,596	2,84	0,49	1 551 086	5 320 646	0,237	14,794	1 778 077	10,010	47,599	15,473
	median	0,100	4 822 389	180 180	,	0,223	0,401	2,00	0,50	512 226	2 532 816	0,143	14,745	509 652	7,000	48,000	15,421
	standard deviation	0,173	20 000 000	1 365 292	,	0,486	1,395	1,85	0,14	6 283 051	11 500 000	0,249	1,110	5 031 514	10,481	10,662	1,136
	observations	7 969	7 969	7 969	,	7 969	7 969	7 969	7 969	7 969	7 969	7 969	7 969	7 969	7 969	7 969	7 770
2002	*mean*	0,109	10 200 000	466 776	,	0,297	0,672	2,83	0,49	1 439 502	5 590 614	0,230	14,814	1 781 781	11,043	48,738	15,501
	median	0,107	4 920 041	212 257	,	0,215	0,506	2,00	0,50	438 495	2 603 008	0,133	14,772	504 587	9,000	49,000	15,447
	standard deviation	0,187	21 800 000	1 518 173	,	0,840	1,441	1,75	0,14	8 785 496	16 300 000	0,248	1,120	5 220 934	10,543	10,726	1,143
	observations	8 077	8 077	8 077	,	8 077	8 077	8 077	8 077	8 077	8 077	8 077	8 077	8 077	8 077	8 077	7 863
2003	*mean*	0,098	9 524 718	421 476	0,249	0,313	0,838	2,79	0,49	1 192 780	5 229 624	0,227	14,724	1 812 848	10,245	47,623	15,395
	median	0,097	4 497 570	173 460	0,148	0,227	0,646	2,00	0,50	359 310	2 344 808	0,127	14,668	483 210	8,000	48,000	15,362
	standard deviation	0,199	21 100 000	1 765 350	0,313	0,796	1,518	1,39	0,14	8 811 540	15 800 000	0,251	1,131	5 820 257	10,421	10,568	1,191
	observations	9 710	9 710	9 710	7 213	9 710	9 710	9 710	9 710	9 710	9 710	9 710	9 710	9 710	9 710	9 710	9 436
2004	*mean*	0,111	10 200 000	542 420	0,239	0,310	1,095	2,77	0,49	1 017 857	5 474 474	0,217	14,793	1 881 948	10,777	48,156	15,489
	median	0,107	4 853 550	233 415	0,144	0,227	0,921	2,00	0,50	322 335	2 494 700	0,118	14,730	519 935	8,000	48,000	15,435
	standard deviation	0,198	21 000 000	1 781 669	0,302	0,809	1,536	1,31	0,14	5 934 591	15 000 000	0,245	1,123	6 141 745	10,390	10,515	1,155
	observations	9 515	9 515	9 515	7 036	9 515	9 515	9 515	9 515	9 515	9 515	9 515	9 515	9 515	9 515	9 515	9 239
2005	*mean*	0,099	8 718 077	467 134	0,241	0,322	0,910	2,74	0,49	1 217 054	4 697 519	0,215	14,658	1 658 993	10,407	48,193	15,354
	median	0,095	4 310 820	170 100	0,142	0,240	0,704	2,00	0,50	481 140	2 201 580	0,119	14,605	489 645	8,000	48,000	15,318
	standard deviation	0,204	18 800 000	2 342 201	0,319	0,621	1,482	1,34	0,13	5 313 911	11 500 000	0,244	1,099	5 278 550	10,122	10,738	1,143
	observations	8 539	8 539	8 539	5 596	8 539	8 539	8 539	8 539	8 539	8 539	8 539	8 539	8 539	8 539	8 539	8 319
2006	*mean*	0,096	10 000 000	562 022	0,264	0,308	0,787	2,68	0,49	1 740 006	5 814 766	0,201	14,856	1 989 946	11,147	49,012	15,499
	median	0,097	5 025 776	229 264	0,171	0,232	0,636	2,00	0,50	669 760	2 695 784	0,106	14,807	584 752	9,000	49,000	15,461
	standard deviation	0,195	23 000 000	1 749 222	0,299	0,304	1,370	1,71	0,13	7 314 422	16 000 000	0,236	1,085	7 373 705	10,448	10,820	1,142
	observations	5 675	5 675	5 675	4 461	5 675	5 675	5 675	5 675	5 675	5 675	5 675	5 675	5 675	5 675	5 675	5 555
2007	*mean*	0,104	9 559 687	586 959	0,248	0,293	0,754	2,74	0,49	1 723 663	5 364 755	0,203	14,807	1 771 850	10,640	48,863	15,465
	median	0,108	4 852 764	232 263	0,160	0,210	0,620	2,00	0,50	696 789	2 616 791	0,105	14,777	503 433	9,000	49,000	15,435
	standard deviation	0,199	18 500 000	2 132 147	0,285	0,301	1,378	1,49	0,13	6 380 375	13 000 000	0,237	1,093	6 143 675	10,464	10,928	1,132
	observations	8 308	8 308	8 308	5 811	8 308	8 308	8 308	8 308	8 308	8 308	8 308	8 308	8 308	8 308	8 308	8 101
2008	*mean*	0,081	9 328 579	438 924	0,241	0,288	0,588	2,74	0,49	2 322 587	6 159 718	0,212	14,809	1 793 235	10,820	49,121	15,453
	median	0,087	4 832 544	164 720	0,152	0,193	0,439	2,00	0,50	747 488	2 612 232	0,113	14,776	453 264	8,000	49,000	15,431
	standard deviation	0,200	17 100 000	2 098 806	0,280	0,307	1,431	1,39	0,14	46 600 000	71 600 000	0,243	1,101	6 429 818	10,589	10,994	1,132
	observations	8 266	8 266	8 266	6 032	8 266	8 266	8 266	8 266	8 266	8 266	8 266	8 266	8 266	8 266	8 266	8 063
2009	*mean*	0,070	8 571 091	407 803	0,224	0,284	0,684	2,73	0,49	1 939 696	5 266 156	0,211	14,799	1 660 350	11,156	49,454	15,384
	median	0,076	4 608 128	140 112	0,139	0,187	0,516	2,00	0,50	776 176	2 624 320	0,111	14,780	431 456	9,000	50,000	15,384
	standard deviation	0,194	16 100 000	1 692 156	0,285	0,320	1,412	1,34	0,14	5 638 110	11 600 000	0,244	1,091	5 732 634	10,709	11,103	1,130
	observations	8 161	8 161	8 161	5 814	8 161	8 161	8 161	8 161	8 161	8 161	8 161	8 161	8 161	8 161	8 161	7 929
2010	*mean*	0,061	8 482 677	392 220	0,237	0,280	0,660	2,71	0,49	2 002 785	5 174 032	0,208	14,774	1 558 943	11,410	49,616	15,352
	median	0,069	4 500 384	127 062	0,147	0,181	0,484	2,00	0,50	762 372	2 567 304	0,107	14,758	411 594	9,000	50,000	15,354
	standard deviation	0,210	16 900 000	1 827 943	0,292	0,311	1,385	1,35	0,14	6 274 033	11 800 000	0,242	1,104	5 422 823	10,929	11,163	1,148
	observations	8 141	8 141	8 141	6 322	8 141	8 141	8 141	8 141	8 141	8 141	8 141	8 141	8 141	8 141	8 141	7 941
2011	*mean*	0,071	8 816 039	420 396	0,234	0,278	0,759	2,69	0,49	2 142 319	5 482 142	0,204	14,806	1 664 841	11,613	49,867	15,382
	median	0,078	4 669 632	159 728	0,146	0,181	0,610	2,00	0,50	792 208	2 647 840	0,104	14,789	419 152	9,000	50,000	15,393
	standard deviation	0,200	18 300 000	1 672 974	0,289	0,319	1,394	1,26	0,14	7 391 358	14 500 000	0,241	1,114	6 198 620	10,925	11,245	1,145
	observations	8 171	8 171	8 171	6 351	8 171	8 171	8 171	8 171	8 171	8 171	8 171	8 171	8 171	8 171	8 171	7 982
2012	*mean*	0,072	8 598 485	432 527	0,235	0,268	0,876	2,88	0,51	2 185 548	5 386 348	0,204	14,781	1 607 745	11,551	50,173	15,357
	median	0,078	4 567 785	154 425	0,143	0,166	0,695	2,00	0,50	799 815	2 593 275	0,102	14,768	377 010	8,000	50,000	15,370
	standard deviation	0,210	14 700 000	1 687 689	0,294	0,312	1,459	4,05	0,15	7 348 816	14 300 000	0,243	1,139	6 680 455	11,108	11,339	1,164
	observations	7 995	7 995	7 995	6 051	7 995	7 995	7 995	7 995	7 995	7 995	7 995	7 995	7 995	7 995	7 995	7 802
2013	*mean*	0,064	8 195 797	392 046	0,232	0,265	0,782	2,84	0,51	2 165 122	5 297 576	0,203	14,722	1 612 285	11,536	50,371	15,303
	median	0,072	4 259 612	133 504	0,141	0,158	0,605	2,00	0,50	775 992	2 442 185	0,098	14,708	335 846	8,000	50,000	15,305
	standard deviation	0,213	14 700 000	1 691 678	0,285	0,340	1,446	3,15	0,15	7 686 312	16 100 000	0,244	1,158	8 071 986	11,149	11,457	1,162
	observations	8 090	8 090	8 090	6 013	8 090	8 090	8 090	8 090	8 090	8 090	8 090	8 090	8 090	8 090	8 090	7 882
2014	*mean*	0,069	7 903 039	375 387	0,228	0,258	0,849	2,84	0,51	2 067 116	5 021 881	0,201	14,689	1 473 240	11,575	50,537	15,286
	median	0,077	4 217 751	142 940	0,136	0,157	0,668	2,00	0,50	767 792	2 346 258	0,100	14,668	321 615	8,000	50,000	15,278
	standard deviation	0,213	14 900 000	1 454 857	0,290	0,327	1,475	4,00	0,15	6 402 079	13 800 000	0,241	1,154	6 949 881	11,270	11,485	1,144
	observations	7 589	7 589	7 589	5 575	7 589	7 589	7 589	7 589	7 589	7 589	7 589	7 589	7 589	7 589	7 589	7 429
2015	*mean*	0,063	8 235 402	379 413	0,235	0,251	0,895	2,82	0,51	2 192 826	5 202 770	0,200	14,723	1 491 726	12,563	51,420	15,329
	median	0,071	4 414 000	143 000	0,138	0,148	0,710	2,00	0,50	834 000	2 440 000	0,097	14,708	326 000	9,000	51,000	15,332
	standard deviation	0,212	14 600 000	1 479 936	0,293	0,302	1,529	3,69	0,15	6 991 748	15 100 000	0,240	1,149	7 077 818	11,256	11,410	1,164
	observations	6 975	6 975	6 975	5 667	6 975	6 975	6 975	6 975	6 975	6 975	6 975	6 975	6 975	6 975	6 975	6 802
Total	*mean*	0,087	9 132 364	448 849	0,239	0,289	0,778	2,78	0,49	1 761 255	5 340 753	0,214	14,766	1 702 855	10,956	49,059	15,404
	median	0,089	4 623 088	172 672	0,146	0,199	0,599	2,00	0,50	596 032	2 505 141	0,114	14,734	444 880	8,000	49,000	15,383
	standard deviation	0,200	18 400 000	1 757 537	0,295	0,505	1,452	2,32	0,14	13 600 000	22 600 000	0,244	1,121	6 164 535	10,730	11,038	1,152
	observations	128 513	128 513	128 513	77 942	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	128 513	125 236

Table 22: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the classical family firms with family CEO on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Classical family firm without family CEO

Year		roa	revenue	net income	volatilty revenue	leverage	risk-return	# owners	herfindahl	equity	total assets	tangibility	asset intensity	total debt	company age	age ceo	company size
2000	*mean*	0,081	12 400 000	473 203	,	0,314	0,450	2,38	0,65	2 881 682	7 215 682	0,234	14,842	1 974 124	10,067	47,615	15,564
	median	0,087	5 239 050	170 263	,	0,245	0,233	2,00	0,55	544 575	2 582 425	0,129	14,764	557 825	8,000	45,000	15,521
	standard deviation	0,212	24 800 000	1 434 406	,	0,288	1,458	2,58	0,28	23 900 000	29 000 000	0,258	1,264	5 836 155	10,533	15,876	1,305
	observations	1 072	1 072	1 072	,	1 072	1 072	1 072	1 072	1 072	1 072	1 072	1 072	1 072	1 072	1 072	1 028
2001	*mean*	0,089	13 200 000	500 259	,	0,317	0,534	2,40	0,65	2 592 968	7 399 534	0,223	14,883	2 153 345	10,484	48,043	15,645
	median	0,094	5 512 221	168 597	,	0,240	0,286	2,00	0,55	523 809	2 833 974	0,120	14,857	610 038	9,000	46,000	15,597
	standard deviation	0,212	25 200 000	1 530 665	,	0,385	1,448	2,42	0,28	22 100 000	26 800 000	0,249	1,297	5 542 505	10,091	15,196	1,283
	observations	1 193	1 193	1 193	,	1 193	1 193	1 193	1 193	1 193	1 193	1 193	1 193	1 193	1 193	1 193	1 143
2002	*mean*	0,089	13 800 000	537 613	,	0,321	0,569	2,41	0,64	2 171 964	7 580 436	0,223	14,926	2 292 573	11,400	48,071	15,723
	median	0,099	6 023 269	180 482	,	0,240	0,394	2,00	0,55	465 186	2 922 029	0,130	14,888	599 277	9,000	46,000	15,660
	standard deviation	0,221	25 100 000	2 498 108	,	0,341	1,525	1,91	0,28	19 600 000	24 300 000	0,245	1,277	5 893 006	9,988	13,715	1,251
	observations	1 234	1 234	1 234	,	1 234	1 234	1 234	1 234	1 234	1 234	1 234	1 234	1 234	1 234	1 234	1 190
2003	*mean*	0,066	13 000 000	510 803	0,272	0,328	0,715	2,29	0,66	1 489 158	6 924 918	0,205	14,752	2 237 973	10,855	46,725	15,543
	median	0,084	4 965 912	136 290	0,150	0,253	0,469	2,00	0,55	365 505	2 356 578	0,104	14,673	526 575	9,000	45,000	15,493
	standard deviation	0,253	32 500 000	2 484 848	0,345	0,343	1,702	1,49	0,27	8 014 831	24 300 000	0,243	1,300	6 761 845	10,069	13,017	1,337
	observations	1 903	1 903	1 903	1 375	1 903	1 903	1 903	1 903	1 903	1 903	1 903	1 903	1 903	1 903	1 903	1 809
2004	*mean*	0,072	16 900 000	684 305	0,246	0,336	0,912	2,38	0,64	2 334 821	9 149 182	0,194	14,924	2 744 027	11,276	46,305	15,743
	median	0,092	6 232 428	185 250	0,141	0,256	0,731	2,00	0,55	356 915	2 794 805	0,094	14,843	657 020	9,000	45,500	15,701
	standard deviation	0,268	51 600 000	11 300 000	0,331	0,314	1,660	1,62	0,27	21 000 000	39 900 000	0,232	1,299	8 934 003	10,807	11,239	1,288
	observations	1 550	1 550	1 550	1 088	1 550	1 550	1 550	1 550	1 550	1 550	1 550	1 550	1 550	1 550	1 550	1 500
2005	*mean*	0,034	11 000 000	783 440	0,255	0,370	0,571	2,36	0,64	2 281 571	7 371 860	0,189	14,614	2 238 074	10,872	46,134	15,430
	median	0,067	4 657 095	97 200	0,146	0,277	0,371	2,00	0,55	379 080	1 976 805	0,086	14,497	535 815	8,000	45,000	15,398
	standard deviation	0,326	35 500 000	12 500 000	0,326	0,406	1,554	2,24	0,27	28 400 000	46 100 000	0,232	1,265	7 624 266	11,285	11,091	1,230
	observations	1 390	1 390	1 390	833	1 390	1 390	1 390	1 390	1 390	1 390	1 390	1 390	1 390	1 390	1 390	1 350
2006	*mean*	0,029	11 500 000	590 619	0,314	0,356	0,410	2,09	0,69	2 905 475	8 331 341	0,173	14,576	2 861 188	11,043	46,524	15,414
	median	0,068	4 343 780	108 192	0,185	0,251	0,308	2,00	0,58	426 328	1 962 912	0,064	14,490	444 360	8,000	46,000	15,338
	standard deviation	0,327	30 100 000	10 600 000	0,353	0,517	1,487	1,68	0,27	42 600 000	58 700 000	0,233	1,324	23 600 000	11,107	10,886	1,314
	observations	1 124	1 124	1 124	834	1 124	1 124	1 124	1 124	1 124	1 124	1 124	1 124	1 124	1 124	1 124	1 069
2007	*mean*	0,079	11 600 000	1 151 944	0,260	0,321	0,580	2,47	0,60	4 558 851	9 164 372	0,183	14,831	1 835 093	10,454	45,270	15,592
	median	0,093	5 597 892	194 535	0,165	0,225	0,442	2,00	0,52	565 331	2 625 044	0,077	14,781	550 004	7,000	44,000	15,569
	standard deviation	0,245	19 800 000	21 100 000	0,297	0,321	1,395	1,68	0,27	68 200 000	71 900 000	0,230	1,190	4 860 829	11,011	10,882	1,219
	observations	1 032	1 032	1 032	657	1 032	1 032	1 032	1 032	1 032	1 032	1 032	1 032	1 032	1 032	1 032	1 007
2008	*mean*	0,049	11 400 000	-314 142	0,251	0,327	0,431	2,54	0,62	3 690 202	7 960 889	0,191	14,787	2 049 621	10,843	45,499	15,566
	median	0,074	5 419 856	117 008	0,159	0,224	0,281	2,00	0,52	579 928	2 528 736	0,077	14,743	506 656	7,000	45,000	15,541
	standard deviation	0,254	19 000 000	15 900 000	0,295	0,369	1,483	2,28	0,28	48 000 000	54 800 000	0,240	1,214	7 648 320	11,557	10,982	1,214
	observations	1 070	1 070	1 070	718	1 070	1 070	1 070	1 070	1 070	1 070	1 070	1 070	1 070	1 070	1 070	1 039
2009	*mean*	0,028	10 900 000	335 712	0,225	0,323	0,498	2,43	0,63	4 149 054	8 382 972	0,196	14,757	1 966 511	10,608	45,937	15,496
	median	0,065	4 843 872	116 760	0,137	0,202	0,377	2,00	0,52	631 616	2 443 064	0,083	14,709	483 720	7,000	45,000	15,432
	standard deviation	0,281	20 600 000	4 039 152	0,286	0,432	1,422	1,83	0,28	49 900 000	54 500 000	0,247	1,257	7 836 354	10,889	10,900	1,200
	observations	1 071	1 071	1 071	686	1 071	1 071	1 071	1 071	1 071	1 071	1 071	1 071	1 071	1 071	1 071	1 038
2010	*mean*	0,034	11 800 000	459 661	0,231	0,323	0,577	2,44	0,63	4 520 943	8 793 009	0,190	14,780	2 242 164	10,393	46,698	15,561
	median	0,064	5 142 210	125 976	0,139	0,210	0,437	2,00	0,52	624 450	2 542 326	0,081	14,749	434 400	7,000	46,000	15,504
	standard deviation	0,296	22 200 000	2 993 111	0,289	0,482	1,440	1,78	0,28	51 400 000	56 400 000	0,242	1,267	9 494 138	10,167	11,437	1,224
	observations	1 131	1 131	1 131	796	1 131	1 131	1 131	1 131	1 131	1 131	1 131	1 131	1 131	1 131	1 131	1 104
2011	*mean*	0,036	11 800 000	385 870	0,217	0,320	0,601	2,41	0,64	2 826 511	6 867 522	0,187	14,830	1 909 775	10,816	46,448	15,588
	median	0,065	5 355 176	131 856	0,132	0,229	0,452	2,00	0,52	602 464	2 653 736	0,083	14,791	527 424	7,000	46,000	15,523
	standard deviation	0,278	19 700 000	1 339 164	0,266	0,328	1,460	1,76	0,28	31 600 000	35 800 000	0,237	1,193	6 148 697	10,380	11,333	1,203
	observations	1 148	1 148	1 148	819	1 148	1 148	1 148	1 148	1 148	1 148	1 148	1 148	1 148	1 148	1 148	1 119
2012	*mean*	0,053	11 400 000	558 847	0,211	0,309	0,816	2,63	0,65	2 941 565	7 366 881	0,190	14,780	2 242 929	10,641	46,486	15,530
	median	0,081	5 219 565	150 165	0,137	0,198	0,687	2,00	0,55	603 855	2 528 310	0,081	14,743	451 560	7,000	46,000	15,505
	standard deviation	0,264	19 200 000	6 003 844	0,242	0,347	1,543	3,33	0,28	34 400 000	42 300 000	0,239	1,268	17 900 000	11,200	11,115	1,228
	observations	1 215	1 215	1 215	823	1 215	1 215	1 215	1 215	1 215	1 215	1 215	1 215	1 215	1 215	1 215	1 197
2013	*mean*	0,045	11 400 000	479 573	0,208	0,310	0,679	2,58	0,64	3 230 705	7 875 977	0,185	14,699	2 355 293	10,558	46,744	15,473
	median	0,071	4 908 880	126 203	0,134	0,188	0,555	2,00	0,54	532 973	2 290 428	0,074	14,644	415 636	7,000	46,000	15,425
	standard deviation	0,281	19 200 000	3 240 125	0,245	0,400	1,455	2,45	0,28	37 700 000	46 400 000	0,241	1,348	19 800 000	11,294	11,464	1,299
	observations	1 162	1 162	1 162	766	1 162	1 162	1 162	1 162	1 162	1 162	1 162	1 162	1 162	1 162	1 162	1 139
2014	*mean*	0,057	11 700 000	687 574	0,207	0,282	0,766	2,57	0,66	4 078 035	8 338 532	0,191	14,728	1 951 171	10,479	46,725	15,491
	median	0,075	4 880 380	136 814	0,129	0,185	0,628	2,00	0,56	622 810	2 350 853	0,083	14,670	371 644	7,000	46,000	15,425
	standard deviation	0,251	32 700 000	6 539 784	0,243	0,342	1,423	4,28	0,28	46 000 000	51 800 000	0,246	1,323	9 925 906	11,040	11,522	1,203
	observations	996	996	996	666	996	996	996	996	996	996	996	996	996	996	996	981
2015	*mean*	0,030	11 900 000	685 966	0,218	0,286	0,750	2,51	0,67	4 115 310	8 354 063	0,182	14,718	1 916 142	11,521	47,400	15,489
	median	0,073	4 833 000	120 500	0,141	0,198	0,630	2,00	0,56	624 000	2 296 500	0,074	14,647	394 000	8,000	47,000	15,422
	standard deviation	0,285	33 100 000	6 287 836	0,263	0,387	1,583	4,21	0,28	48 300 000	53 900 000	0,240	1,287	9 215 624	11,805	11,691	1,267
	observations	1 022	1 022	1 022	773	1 022	1 022	1 022	1 022	1 022	1 022	1 022	1 022	1 022	1 022	1 022	1 005
Total	*mean*	0,055	12 400 000	535 923	0,242	0,323	0,627	2,42	0,64	3 044 753	7 902 253	0,196	14,778	2 207 750	10,789	46,668	15,557
	median	0,079	5 196 135	140 940	0,145	0,226	0,452	2,00	0,55	501 795	2 464 192	0,090	14,717	504 825	8,000	46,000	15,510
	standard deviation	0,269	29 200 000	8 705 506	0,300	0,378	1,525	2,42	0,28	37 600 000	45 500 000	0,241	1,279	11 100 000	10,803	12,164	1,262
	observations	19 313	19 313	19 313	10 834	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	19 313	18 718

Table 23: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the classical family firms without family CEO on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Non-family firm

Year		roa	revenue	net income	volatilty revenue	leverage	risk-return	number of owners	herfindahl	equity	total assets	tangibility	asset intensity	total debt	company age	age ceo	company size
2000	*mean*	0,087	11 300 000	534 335	,	0,318	0,453	4,48	0,37	1 973 597	6 305 531	0,213	14,794	2 066 991	8,033	45,255	15,541
	median	0,090	5 228 450	152 375	,	0,252	0,249	3,00	0,34	540 600	2 557 250	0,110	14,754	552 525	6,000	45,000	15,535
	standard deviation	0,193	29 500 000	4 239 689	,	0,300	1,453	7,40	0,15	11 100 000	19 200 000	0,246	1,229	6 321 042	9,679	10,463	1,215
	observations	4 857	4 857	4 857	,	4 857	4 857	4 857	4 857	4 857	4 857	4 857	4 857	4 857	4 857	4 857	4 647
2001	*mean*	0,088	12 200 000	421 785	,	0,322	0,479	4,53	0,37	2 083 948	7 006 476	0,211	14,889	2 442 908	8,744	46,055	15,632
	median	0,092	5 716 854	169 884	,	0,252	0,300	3,00	0,34	528 957	2 805 660	0,105	14,847	604 890	6,000	46,000	15,609
	standard deviation	0,193	34 900 000	2 763 592	,	0,334	1,404	6,85	0,15	16 000 000	27 200 000	0,246	1,210	10 300 000	9,513	10,315	1,175
	observations	5 102	5 102	5 102	,	5 102	5 102	5 102	5 102	5 102	5 102	5 102	5 102	5 102	5 102	5 102	4 918
2002	*mean*	0,091	12 800 000	520 239	,	0,316	0,537	4,30	0,36	2 018 546	7 545 436	0,206	14,938	2 638 491	9,700	47,004	15,691
	median	0,095	5 991 494	181 753	,	0,238	0,362	3,00	0,34	499 503	2 902 964	0,097	14,881	611 351	7,000	47,000	15,656
	standard deviation	0,205	36 200 000	6 621 643	,	0,309	1,448	4,76	0,15	16 900 000	30 100 000	0,247	1,210	11 400 000	9,457	10,306	1,141
	observations	5 237	5 237	5 237	,	5 237	5 237	5 237	5 237	5 237	5 237	5 237	5 237	5 237	5 237	5 237	5 057
2003	*mean*	0,071	11 700 000	410 123	0,281	0,328	0,681	4,23	0,36	1 797 613	7 185 833	0,200	14,822	2 661 244	8,486	45,664	15,546
	median	0,084	5 103 441	144 963	0,165	0,246	0,472	3,00	0,33	392 763	2 546 145	0,090	14,750	564 984	6,000	45,000	15,511
	standard deviation	0,242	32 700 000	3 282 452	0,339	0,325	1,563	4,26	0,15	16 100 000	30 800 000	0,249	1,247	13 000 000	9,449	10,022	1,214
	observations	7 167	7 167	7 167	4 340	7 167	7 167	7 167	7 167	7 167	7 167	7 167	7 167	7 167	7 167	7 167	6 860
2004	*mean*	0,088	13 300 000	631 595	0,264	0,326	0,962	4,22	0,37	1 788 008	7 821 543	0,190	14,899	2 755 654	8,905	46,164	15,656
	median	0,100	5 664 945	217 360	0,156	0,242	0,788	3,00	0,34	375 440	2 754 050	0,082	14,829	598 975	6,000	46,000	15,607
	standard deviation	0,240	40 700 000	3 940 217	0,339	0,344	1,595	3,99	0,15	16 800 000	40 400 000	0,241	1,241	12 400 000	9,449	9,915	1,184
	observations	7 081	7 081	7 081	4 197	7 081	7 081	7 081	7 081	7 081	7 081	7 081	7 081	7 081	7 081	7 081	6 830
2005	*mean*	0,082	13 100 000	585 479	0,260	0,344	0,867	4,21	0,38	1 932 878	7 319 129	0,187	14,877	2 806 704	8,757	45,972	15,596
	median	0,091	5 358 150	182 250	0,150	0,264	0,673	3,00	0,34	574 695	2 684 543	0,078	14,803	622 688	6,000	46,000	15,548
	standard deviation	0,233	42 200 000	2 105 767	0,345	0,613	1,570	4,20	0,16	6 913 441	20 300 000	0,241	1,262	10 600 000	9,739	9,946	1,238
	observations	7 748	7 748	7 748	3 981	7 748	7 748	7 748	7 748	7 748	7 748	7 748	7 748	7 748	7 748	7 748	7 479
2006	*mean*	0,084	13 700 000	688 783	0,293	0,327	0,732	3,61	0,42	2 196 901	7 752 211	0,184	14,964	2 828 478	9,518	46,874	15,665
	median	0,090	5 859 112	215 096	0,188	0,251	0,575	3,00	0,45	660 744	2 986 872	0,075	14,910	657 524	7,000	47,000	15,623
	standard deviation	0,223	47 400 000	3 556 552	0,322	0,331	1,454	3,55	0,16	14 600 000	28 200 000	0,237	1,218	11 000 000	9,700	10,194	1,204
	observations	9 820	9 820	9 820	6 842	9 820	9 820	9 820	9 820	9 820	9 820	9 820	9 820	9 820	9 820	9 820	9 549
2007	*mean*	0,095	13 600 000	612 101	0,273	0,305	0,692	4,26	0,37	2 226 353	8 219 972	0,177	14,944	3 021 671	8,505	46,152	15,629
	median	0,101	5 701 644	224 010	0,181	0,218	0,527	3,00	0,33	664 956	2 879 708	0,068	14,873	563 562	6,000	46,000	15,608
	standard deviation	0,225	47 600 000	10 300 000	0,303	0,304	1,459	4,63	0,16	12 700 000	30 900 000	0,238	1,251	14 600 000	9,542	10,138	1,231
	observations	7 534	7 534	7 534	4 395	7 534	7 534	7 534	7 534	7 534	7 534	7 534	7 534	7 534	7 534	7 534	7 281
2008	*mean*	0,071	13 200 000	502 184	0,273	0,303	0,593	4,32	0,38	2 354 397	8 184 760	0,183	14,933	3 166 662	8,586	46,272	15,640
	median	0,087	5 712 376	168 128	0,180	0,204	0,426	3,00	0,34	703 184	2 837 728	0,071	14,859	516 880	6,000	46,000	15,610
	standard deviation	0,253	39 000 000	3 223 294	0,304	0,312	1,515	4,70	0,16	19 200 000	37 300 000	0,244	1,250	20 000 000	9,474	10,164	1,226
	observations	7 576	7 576	7 576	4 719	7 576	7 576	7 576	7 576	7 576	7 576	7 576	7 576	7 576	7 576	7 576	7 330
2009	*mean*	0,056	12 000 000	379 175	0,243	0,296	0,662	4,38	0,38	2 457 558	8 312 477	0,185	14,899	3 257 800	8,882	46,494	15,562
	median	0,072	5 265 320	134 552	0,150	0,198	0,459	3,00	0,35	720 576	2 695 488	0,071	14,807	490 392	6,000	46,000	15,529
	standard deviation	0,237	33 700 000	7 765 473	0,302	0,315	1,491	5,15	0,16	18 400 000	48 500 000	0,246	1,239	32 500 000	9,458	10,250	1,207
	observations	7 623	7 623	7 623	4 583	7 623	7 623	7 623	7 623	7 623	7 623	7 623	7 623	7 623	7 623	7 623	7 378
2010	*mean*	0,058	11 800 000	449 070	0,257	0,296	0,682	4,37	0,38	2 375 684	8 226 409	0,184	14,884	3 331 016	8,929	46,702	15,550
	median	0,069	5 287 734	135 750	0,157	0,198	0,471	3,00	0,35	722 190	2 706 312	0,069	14,811	488 700	6,000	46,000	15,524
	standard deviation	0,236	34 800 000	2 330 344	0,313	0,317	1,477	5,04	0,16	19 700 000	51 700 000	0,246	1,243	37 100 000	9,498	10,281	1,198
	observations	7 759	7 759	7 759	5 128	7 759	7 759	7 759	7 759	7 759	7 759	7 759	7 759	7 759	7 759	7 759	7 508
2011	*mean*	0,065	12 300 000	370 869	0,255	0,298	0,769	4,37	0,38	2 339 794	8 366 392	0,177	14,909	3 446 211	9,024	46,885	15,577
	median	0,078	5 344 992	165 088	0,157	0,199	0,587	3,00	0,35	725 744	2 722 880	0,065	14,817	483 472	6,000	46,000	15,544
	standard deviation	0,230	35 500 000	12 400 000	0,309	0,338	1,483	4,98	0,16	9 135 767	44 100 000	0,242	1,262	35 100 000	9,551	10,285	1,216
	observations	7 827	7 827	7 827	5 181	7 827	7 827	7 827	7 827	7 827	7 827	7 827	7 827	7 827	7 827	7 827	7 578
2012	*mean*	0,065	12 200 000	440 059	0,250	0,286	0,872	7,83	0,38	2 345 085	7 678 015	0,176	14,852	2 822 268	8,932	46,999	15,545
	median	0,077	5 140 223	154 425	0,155	0,179	0,654	3,00	0,36	697 575	2 598 068	0,062	14,770	416 415	6,000	46,000	15,495
	standard deviation	0,246	32 400 000	7 170 369	0,298	0,391	1,526	26,32	0,14	10 600 000	28 500 000	0,243	1,297	16 000 000	9,521	10,437	1,229
	observations	8 436	8 436	8 436	5 385	8 436	8 436	8 436	8 436	8 436	8 436	8 436	8 436	8 436	8 436	8 436	8 206
2013	*mean*	0,054	12 000 000	544 510	0,252	0,278	0,784	7,11	0,38	2 357 720	7 596 550	0,171	14,794	2 774 331	9,000	47,195	15,510
	median	0,071	4 991 798	124 117	0,155	0,174	0,586	3,00	0,38	685 251	2 460 437	0,058	14,716	383 824	6,000	47,000	15,462
	standard deviation	0,248	33 900 000	5 118 238	0,299	0,323	1,533	22,33	0,14	12 000 000	32 500 000	0,239	1,321	17 000 000	9,524	10,533	1,240
	observations	8 511	8 511	8 511	5 547	8 511	8 511	8 511	8 511	8 511	8 511	8 511	8 511	8 511	8 511	8 511	8 295
2014	*mean*	0,066	11 800 000	464 524	0,244	0,271	0,887	6,08	0,38	2 364 077	7 450 632	0,171	14,779	2 719 327	9,168	47,300	15,516
	median	0,075	4 946 745	136 814	0,144	0,173	0,645	3,00	0,38	657 524	2 390 161	0,057	14,687	365 008	6,000	47,000	15,439
	standard deviation	0,240	30 100 000	2 446 242	0,303	0,316	1,574	14,83	0,14	8 757 661	25 400 000	0,242	1,316	16 300 000	9,697	10,592	1,214
	observations	7 932	7 932	7 932	5 062	7 932	7 932	7 932	7 932	7 932	7 932	7 932	7 932	7 932	7 932	7 932	7 768
2015	*mean*	0,059	12 300 000	474 313	0,245	0,271	0,949	5,74	0,39	2 493 382	7 867 754	0,168	14,815	2 930 302	10,110	48,066	15,589
	median	0,074	5 263 500	134 000	0,149	0,169	0,731	3,00	0,38	729 000	2 487 500	0,054	14,727	374 000	7,000	48,000	15,509
	standard deviation	0,242	33 700 000	2 367 121	0,300	0,314	1,621	14,05	0,14	8 729 641	27 600 000	0,240	1,303	18 500 000	9,723	10,573	1,177
	observations	7 124	7 124	7 124	5 246	7 124	7 124	7 124	7 124	7 124	7 124	7 124	7 124	7 124	7 124	7 124	6 981
Total	*mean*	0,073	12 500 000	505 288	0,261	0,304	0,741	4,92	0,38	2 210 256	7 728 354	0,185	14,876	2 886 665	8,975	46,614	15,588
	median	0,084	5 387 672	163 816	0,161	0,212	0,550	3,00	0,36	612 600	2 687 504	0,073	14,804	506 150	6,000	46,000	15,549
	standard deviation	0,234	37 300 000	5 850 178	0,313	0,354	1,521	11,48	0,15	14 100 000	34 300 000	0,243	1,261	20 200 000	9,575	10,295	1,211
	observations	117 334	117 334	117 334	64 606	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	117 334	113 665

Table 24: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the non-family firms on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Appendix 5 – Correlation Matrices

Correlation matrix	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
(1) entrepstarial family firm	1																					
(2) single owner family firm	-0,2032	1																				
(3) classical family firm w/ family CEO	-0,3475	-0,2953	1																			
(4) classical family firm w/o family CEO	-0,108	-0,0918	-0,1569	1																		
(5) Non-family firm	-0,3032	-0,2577	-0,4407	-0,1369	1																	
(6) roa	0,0106	0,0073	-0,0014	-0,025	-0,0019	1																
(7) volatilty in revenue	0,038	-0,0236	-0,0319	-0,0086	0,0229	-0,053	1															
(8) risk-return ratio	0,0079	-0,0037	-0,0058	-0,0174	0,0102	0,7168	-0,1017	1														
(9) revenue	-0,0566	-0,0341	-0,0207	0,024	0,0873	0,0314	-0,0351	0,0881	1													
(10) net income	-0,023	-0,0126	-0,0001	0,0068	0,0272	0,1743	0,0103	0,1928	0,1622	1												
(11) total assets	-0,0589	-0,0292	-0,0026	0,0191	0,0688	0,0159	0,0525	0,0485	0,4779	0,1896	1											
(12) tangibility	-0,0044	0,0006	0,0461	-0,0072	-0,0418	-0,0864	0,0493	-0,0732	-0,0354	-0,0213	0,0893	1										
(13) total debt	-0,0339	-0,0236	-0,0057	0,007	0,0512	-0,0232	0,0525	-0,0116	0,3019	0,0255	0,7713	0,1227	1									
(14) leverage	0,0066	-0,0372	0,0008	0,021	0,0129	-0,2447	0,0331	-0,2359	0,0659	-0,0569	0,0375	0,2408	0,1305	1								
(15) equity	-0,0415	-0,0113	0,0033	0,0185	0,0333	0,0349	0,0236	0,0584	0,3282	0,2818	0,7326	0,0209	0,2252	-0,0563	1							
(16) company age	-0,3234	0,271	0,0814	0,0246	-0,0269	-0,0049	-0,0952	0,0056	0,0546	0,033	0,0647	0,0137	0,0069	-0,073	0,0908	1						
(17) company size	-0,1323	-0,0833	0,0151	0,0394	0,148	0,1259	-0,2526	0,2002	0,5195	0,1442	0,2664	-0,0434	0,1734	0,1143	0,1755	0,0763	1					
(18) age ceo	-0,1257	0,1584	0,0723	-0,0387	-0,0727	0,012	-0,022	0,0085	-0,0371	0,0064	0,0199	-0,0314	-0,0007	-0,1137	0,0339	0,2924	-0,1067	1				
(19) herfindahl	0,5939	0,5047	-0,3509	-0,008	-0,5489	0,0059	0,0026	-0,0102	-0,1086	-0,0419	-0,1031	-0,0049	-0,0656	-0,0165	-0,0695	-0,0576	-0,212	0,0149	1			
(20) number of owners	-0,1399	-0,1189	0,0030	-0,0094	0,2186	-0,0223	0,0252	-0,0108	0,1128	-0,003	0,115	0,005	0,0795	0,006	0,0819	0,0214	0,0996	0,003	-0,3008	1		
(21) asset intensity	-0,1500	-0,0409	0,0376	0,0161	0,1174	0,1742	0,0014	0,2455	0,4293	0,1877	0,4172	0,2134	0,2716	0,0318	0,3130	0,1688	0,6763	0,0312	-0,2145	0,1433	1,0000	
(22) growth in gdp	-0,0469	-0,0142	0,0134	0,0115	0,0330	0,0542	0,0245	0,0402	0,0168	0,0169	0,0035	0,0018	0,0048	0,0282	-0,0146	0,0108	0,0339	-0,0175	-0,0411	0,0031	0,0105	1,0000

Table 25: The table presents correlation coefficients between the family firm types and the main variables.

Correlation matrix	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) growth in GDP	1,0000									
(2) AFFM	0,0258	1,0000								
(3) MACH	0,0198	-0,0553	1,0000							
(4) ENGY	-0,0027	-0,0088	-0,0148	1,0000						
(5) ICOR	-0,0102	-0,0994	-0,1671	-0,0266	1,0000					
(6) LOGI	-0,0037	-0,0407	-0,0684	-0,0109	-0,1230	1,0000				
(7) TRAD	0,0185	-0,1152	-0,1938	-0,0309	-0,3482	-0,1426	1,0000			
(8) SERV	-0,0227	-0,1066	-0,1793	-0,0286	-0,3221	-0,1319	-0,3735	1,0000		
(9) HEDU	-0,0115	-0,0407	-0,0685	-0,0109	-0,1231	-0,0504	-0,1428	-0,1320	1,0000	
(10) CULT	-0,0083	-0,0176	-0,0297	-0,0047	-0,0533	-0,0218	-0,0618	-0,0572	-0,0218	1,0000

Table 26: The table presents correlation coefficients between growth in GDP and the different industries.

Appendix 6 – Industry Description

Classifying firms by their NACE level code from SSB into one of 8 industry sectors and 3 filter industries

NACE code	NACE label	Industry sector code	Industry sector	Abbreviation
1-3	Agriculture, hunting and fishing	1	Agriculture, forestry, fishing and mining	AFFM
5,7-9	Mining	1	Agriculture, forestry, fishing and mining	AFFM
10-33	Industry	2	Manufacturing, chemical products	MACH
6	Extraction of oil and natural gas	3	Energy	ENGY
35	Electricity, gas, steam and hot water supply	3	Energy	ENGY
36-39	Water supply, sewerage and rehabilitation activities	4	Infrastructure, construction and operation of real estate	ICOR
41-43	Construction	4	Infrastructure, construction and operation of real estate	ICOR
68	Turnover and operation of real estate	4	Infrastructure, construction and operation of real estate	ICOR
49-53	Transport and storage	5	Logistics	LOGI
45-47	Wholesale trade, repair of motor vehicles	6	Trade	TRAD
55-56	Accommodation and catering activities	7	Service	SERV
58-63	Information and communication	7	Service	SERV
69-75	Professional, scientific and technical services	7	Service	SERV
77-82	Business services	7	Service	SERV
94-96	Other services	7	Service	SERV
97	Salary work in private households	7	Service	SERV
85	Education	8	Health services and education	HEDU
86-88	Health and social services	8	Health services and education	HEDU
90-93	Cultural activities, entertainment and leisure activities	9	Culture	CULT
		Industry filters		
64-66	Finance- and insurance business	X	Financial	FINA
99	International organizations and organs	XX	International Organizations	INOR
84	Public administration and defense, and social security schemes	XXX	Public	PUBL

Table 27: The table presents the categorized industries by NACE codes. Further the table presents the industry sector codes and the main industry sectors with respective abbreviations.

Appendix 7 – Distribution of Firms Within Industries

Entrepreneurial family firm

Year	AFFM	MACH	ENGY	ICOR	LOGI	TRAD	SERV	HEDU	CULT
2000	102	265	1	644	165	1 150	611	126	12
2001	115	259	1	642	173	1 168	645	141	15
2002	110	244	1	598	162	1 099	602	134	15
2003	161	293	2	824	225	1 483	902	181	22
2004	152	289	2	812	216	1 409	895	189	20
2005	187	255	2	856	216	1 363	912	220	26
2006	192	227	5	846	206	1 248	916	246	26
2007	327	270	4	1 340	301	1 565	1 413	428	38
2008	394	292	4	1 577	341	1 662	1 595	479	48
2009	154	284	4	1 612	355	1 696	1 939	521	63
2010	165	305	3	1 782	368	1 809	2 198	565	75
2011	195	326	4	1 976	427	1 895	2 413	603	76
2012	194	358	4	2 399	482	2 012	2 877	737	104
2013	231	409	5	2 794	576	2 168	3 312	875	125
2014	243	422	6	2 987	593	2 179	3 443	943	129
2015	224	369	4	2 664	530	1 914	3 052	850	115
Total	3 146	4 867	52	24 353	5 336	25 820	27 725	7 238	909

Table 28: The table presents the distribution of entrepreneurial family firms within the industries

Single owner family firm

Year	AFFM	MACH	ENGY	ICOR	LOGI	TRAD	SERV	HEDU	CULT
2000	30	182	0	346	58	644	259	34	2
2001	39	223	0	418	76	798	332	52	2
2002	49	255	0	469	93	925	384	71	3
2003	57	276	0	518	103	1 018	412	74	5
2004	62	292	0	524	104	1 053	438	84	6
2005	62	247	0	454	104	860	380	91	7
2006	70	236	0	446	102	819	402	100	5
2007	82	227	1	499	124	860	457	120	8
2008	90	226	0	534	136	913	515	130	9
2009	49	232	0	616	154	946	666	145	14
2010	50	240	1	631	174	953	677	150	16
2011	59	248	1	684	185	984	725	174	17
2012	52	254	1	697	191	988	760	180	19
2013	55	255	1	748	201	1 049	826	183	21
2014	55	244	1	731	204	1 023	821	185	24
2015	54	244	2	763	210	1 022	840	192	27
Total	915	3 881	8	9 078	2 219	14 855	8 894	1 965	185

Table 29: The table presents the distribution of single owner family firms within the industries

Classical family firm without family CEO

Year	AFFM	MACH	ENGY	ICOR	LOGI	TRAD	SERV	HEDU	CULT
2000	40	119	1	170	51	427	234	20	10
2001	42	130	1	203	54	465	263	22	13
2002	45	133	1	202	57	471	283	26	16
2003	74	200	1	293	80	750	434	50	21
2004	63	176	1	242	54	618	338	44	14
2005	66	134	1	222	43	545	330	39	10
2006	40	100	1	193	48	419	273	42	8
2007	50	88	1	188	45	360	259	33	8
2008	35	99	1	211	45	352	280	37	10
2009	26	92	1	205	57	345	285	39	21
2010	26	87	2	233	52	349	317	43	22
2011	34	91	1	236	60	342	320	45	19
2012	30	96	2	262	59	334	358	53	21
2013	26	89	2	249	70	317	347	45	17
2014	24	78	1	217	66	245	302	45	18
2015	23	74	1	218	60	281	301	48	16
Total	644	1 786	19	3 544	901	6 620	4 924	631	244

Table 30: The table presents the distribution of classical family firms without family CEO within the industries

Classical family firm with family CEO

Year	AFFM	MACH	ENGY	ICOR	LOGI	TRAD	SERV	HEDU	CULT
2000	283	853	2	1 469	380	2 598	1 435	276	36
2001	303	936	3	1 628	411	2 827	1 539	288	34
2002	304	957	3	1 652	409	2 874	1 566	277	35
2003	404	1 087	5	2 072	490	3 374	1 870	355	53
2004	426	1 063	6	2 086	487	3 260	1 790	343	54
2005	387	950	7	1 865	455	2 885	1 613	322	55
2006	245	635	6	1 267	311	1 874	1 085	221	31
2007	384	841	12	1 897	432	2 710	1 634	339	59
2008	390	812	14	1 956	433	2 605	1 644	355	57
2009	257	762	13	1 944	423	2 531	1 795	363	73
2010	254	739	15	1 988	422	2 484	1 809	351	79
2011	250	705	14	2 042	419	2 484	1 830	345	82
2012	235	678	18	2 046	425	2 334	1 830	339	90
2013	243	650	17	2 063	441	2 314	1 896	362	104
2014	228	599	17	1 939	415	2 129	1 823	337	102
2015	216	555	16	1 786	391	1 962	1 662	297	90
Total	4 809	12 822	168	29 700	6 744	41 245	26 821	5 170	1 034

Table 31: The table presents the distribution of classical family firms with family CEO within the industries

Non-family firm

Year	AFFM	MACH	ENGY	ICOR	LOGI	TRAD	SERV	HEDU	CULT
2000	187	679	6	998	175	1 384	1 265	128	35
2001	206	695	6	1 038	182	1 435	1 369	136	35
2002	210	715	8	1 064	197	1 442	1 427	140	34
2003	274	878	21	1 492	268	1 882	2 102	208	42
2004	263	860	23	1 500	257	1 862	2 054	204	58
2005	302	928	36	1 705	268	1 993	2 191	253	72
2006	435	1 090	41	2 202	372	2 653	2 570	359	98
2007	292	761	49	1 799	268	1 761	2 244	281	79
2008	290	698	56	1 854	277	1 746	2 268	302	85
2009	149	634	64	1 848	281	1 710	2 514	315	108
2010	147	599	68	1 881	283	1 746	2 591	323	121
2011	147	575	67	1 938	279	1 758	2 603	334	126
2012	148	577	71	2 070	309	1 877	2 857	388	139
2013	137	556	73	2 075	302	1 888	2 930	406	144
2014	128	527	68	1 969	296	1 722	2 686	399	137
2015	115	469	54	1 795	278	1 560	2 374	355	124
Total	3 430	11 241	711	27 228	4 292	28 419	36 045	4 531	1 437

Table 32: The table presents the distribution of non-family firms within the industries

Appendix 8 – Main Heckman Self-Selection Models

H1A		Corrected	Selection variable
Dependent variable: ROA		**model**	**Family firm**
Control variables	company size_1	0,0006	-0,0111
		(0,0008)	(0,0077)
	leverage_1	-0,1022***	-0,1792***
		(0,0021)	(0,0187)
	herfindahl index	-0,0127**	3,4794***
		(0,0062)	(0,0261)
	number of owners	-0,0012***	-0,0337***
		(0,0004)	(0,0016)
	asset intensity_1	0,0068***	-0,0176**
		(0,0008)	(0,0075)
	company age	-0,0007***	0,0103***
		(0,0001)	(0,0005)
	tangibility	-0,0472***	0,6197***
		(0,0030)	(0,0246)
	age ceo	-0,0003***	0,0055***
		(0,0001)	(0,0005)
Year effect	growth in GDP	0,4129***	-2,4456***
		(0,0277)	(0,2360)
Industry	AFFM	-0,0098	0,6108***
		(0,0098)	(0,0769)
	MACH	-0,0077	0,3418***
		(0,0094)	(0,0731)
	ENGY	-0,0263	-0,7095**
		(0,0536)	(0,2777)
	ICOR	-0,0051	0,2656***
		(0,0094)	(0,0726)
	LOGI	-0,0077	0,3411***
		(0,0096)	(0,0752)
	TRAD	-0,0073	0,4625***
		(0,0094)	(0,0725)
	SERV	0,0034	-0,0483
		(0,0094)	(0,0728)
	HEDU	0,0527***	0,1543*
		(0,0101)	(0,0797)
	constant	0,0565***	-1,4766***
		(0,0158)	(0,1198)
	lambda (inverse Mills ratio)	0,0022	
		(0,0052)	
	Number of observations	117 023	
	P-value	0,0000	
	Selected	75 294	
	Non-selected	41 729	

Table 33: The dependent variable as a measure of performance is ROA, defined under variables. The independent selection variable is "family firm". We include the control variables company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

H1B Dependent variable: ROA		Corrected model	Selection variable Family CEO
Control variables	company size_1	0,0003	-0,0457***
		(0,0008)	(0,0093)
	leverage_1	-0,0881***	-0,0961***
		(0,0021)	(0,0227)
	herfindahl index	-0,0135***	0,5715***
		(0,0051)	(0,0243)
	number of owners	-0,0022***	-0,0228***
		(0,0005)	(0,0028)
	asset intensity_1	0,0087***	-0,0552***
		(0,0010)	(0,0095)
	company age	-0,0006***	-0,0039***
		(0,0001)	(0,0006)
	tangibility	-0,0517***	0,4016***
		(0,0043)	(0,0316)
	age ceo	-0,0003***	0,0107***
		(0,0001)	(0,0006)
Year effect	growth in GDP	0,4415***	-1,2925***
		(0,0282)	(0,3092)
Industry	AFFM	-0,0061	0,4661***
		(0,0101)	(0,0832)
	MACH	-0,0017	0,4631***
		(0,0097)	(0,0783)
	ENGY	0,0713	-0,1801
		(0,0447)	(0,3490)
	ICOR	0,0008	0,6198***
		(0,0105)	(0,0773)
	LOGI	-0,0012	0,6873***
		-0,0109	(0,0815)
	TRAD	-0,0056	0,5571***
		(0,0102)	(0,0769)
	SERV	0,0103	0,2656***
		(0,0088)	(0,0776)
	HEDU	0,0748***	0,5251***
		(0,0104)	(0,0856)
	constant	0,0243*	1,6554***
		(0,0136)	(0,1401)
	lambda (inverse Mills ratio)	0,0049	
		(0,0372)	
	Number of observations	102 353	
	P-value	0,0000	
	Selected	93 741	
	Non-selected	8 612	

Table 34: The dependent variable as a measure of performance is ROA, defined under variables. The independent selection variable is "family CEO", which includes entrepreneurial family firms, single owner family firms and classical family firms with family CEO. We include the control variables company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

H2A		Corrected	Selection variable
Dependent variable: volatility in revenue		model	Family firm
Control variables	roa_1	0,0224***	-0,1356***
		(0,0066)	(0,0376)
	company size_1	-0,0975***	0,0217**
		(0,0012)	(0,0085)
	leverage_1	0,0717***	-0,3030***
		(0,0036)	(0,0224)
	herfindahl index	0,0898***	3,5103***
		(0,0096)	(0,0277)
	number of owners	-0,0004	-0,0323***
		(0,0005)	(0,0017)
	asset intensity_1	0,0604***	0,0052
		(0,0013)	(0,0083)
	company age	-0,0013***	0,0182***
		(0,0001)	(0,0005)
	tangibility	-0,0942***	0,588***
		(0,0045)	(0,0269)
	age ceo	-0,001***	0,0086***
		(0,0001)	(0,0005)
Year effect	growth in GDP	0,256***	-0,4433*
		(0,0396)	(0,2519)
Industry	AFFM	-0,0582***	0,5026***
		(0,0146)	(0,0837)
	MACH	-0,0688***	0,2294***
		(0,0140)	(0,0794)
	ENGY	0,1165	-1,2277***
		(0,1243)	(0,4071)
	ICOR	-0,0202	0,1855**
		(0,0138)	(0,0788)
	LOGI	-0,0539***	0,2786***
		(0,0142)	(0,0817)
	TRAD	-0,0809***	0,3584***
		(0,0139)	(0,0787)
	SERV	-0,0546***	-0,1461*
		(0,0139)	(0,0791)
	HEDU	-0,0838***	0,1128
		(0,0149)	(0,0865)
	constant	0,8935***	-2,7454***
		(0,0262)	(0,1331)
	lambda (inverse Mills ratio)	0,0370***	
		(0,0071)	
	Number of observations	94 887	
	P-value	0,0000	
	Selected	53 158	
	Non-selected	41 729	

Table 35: The dependent variable as a measure of risk is volatility in revenue, defined under variables. The independent selection variable is "family firm", including all family firms. We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

H2B		Corrected	Selection variable
Dependent variable: volatility in revenue		model	Family firm with family CEO
Control variables	roa_1	0,0378***	0,1298***
		(0,0075)	(0,0456)
	company size_1	-0,1015***	-0,0471***
		(0,0015)	(0,0096)
	leverage_1	0,0877***	-0,095***
		(0,0041)	(0,0266)
	herfindahl index	0,0072	-5,1123***
		(0,0209)	(0,0270)
	number of owners	-0,0004	-0,0414***
		(0,0006)	(0,0030)
	asset intensity_1	0,0692***	-0,0627***
		(0,0015)	(0,0099)
	company age	-0,0017***	0,0078***
		(0,0001)	(0,0006)
	tangibility	-0,096***	0,2819***
		(0,0048)	(0,0312)
	age ceo	-0,0008***	0,0131***
		(0,0001)	(0,0006)
Year effect	growth in GDP	0,3553***	1,7215***
		(0,0454)	(0,3172)
Industry	AFFM	-0,0769***	0,2018**
		(0,0164)	(0,1007)
	MACH	-0,0833***	0,2714***
		(0,0158)	(0,0957)
	ENGY	-0,0296	0,7445*
		(0,0729)	(0,3962)
	ICOR	-0,0269*	0,4646***
		(0,0157)	(0,0947)
	LOGI	-0,064***	0,5686***
		(0,0161)	(0,0974)
	TRAD	-0,0944***	0,3630***
		(0,0157)	(0,0944)
	SERV	-0,064***	0,2141**
		(0,0158)	(0,0952)
	HEDU	-0,1086***	0,3614***
		(0,0167)	(0,1013)
	constant	0,8767***	4,0641***
		(0,0269)	(0,1598)
	lambda (inverse Mills ratio)	0,0119	
		(0,0087)	
	Number of observations	87 736	
	P-value	0,0000	
	Selected	38 819	
	Non-selected	48 917	

Table 36: The dependent variable as a measure of risk is volatility in revenue, defined under variables. The independent selection variable is "classical family firms with family CEO". We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

H3A		Corrected	Selection variable
Dependent variable: risk-return ratio		model	Family firm
Control variables	roa_1	3,239***	-0,0995***
		(0,0398)	(0,0334)
	company size_1	0,0076	-0,0091
		(0,0080)	(0,0077)
	leverage_1	-0,5526***	-0,2027***
		(0,0226)	(0,0203)
	herfindahl index	0,0263	3,4786***
		(0,0608)	(0,0261)
	number of owners	-0,0071**	-0,0339***
		(0,0035)	(0,0016)
	asset intensity_1	0,1563***	-0,0169**
		(0,0083)	(0,0075)
	company age	-0,0044***	0,0101***
		(0,0005)	(0,0005)
	tangibility	-0,4330***	0,6204***
		(0,0295)	(0,0246)
	age ceo	-0,0025***	0,0055***
		(0,0005)	(0,0005)
Year effect	growth in GDP	4,1932***	-2,427***
		(0,2731)	(0,2361)
Industry	AFFM	-0,1084	0,6099***
		(0,0968)	(0,0769)
	MACH	0,0314	0,3397***
		(0,093)	(0,0731)
	ENGY	0,1481	-0,7170***
		(0,5281)	(0,2787)
	ICOR	0,0488	0,2647***
		(0,0922)	(0,0726)
	LOGI	0,1149	0,3394***
		(0,0942)	(0,0752)
	TRAD	0,1261	0,4614***
		(0,0923)	(0,0725)
	SERV	0,1878**	-0,0501
		(0,0927)	(0,0728)
	HEDU	0,3495***	0,1558*
		(0,0990)	(0,0797)
	constant	-1,6292***	-1,4966***
		(0,1563)	(0,1200)
	lambda (inverse Mills ratio)	0,0468	
		(0,0511)	
	Number of observations	117 023	
	P-value	0,0000	
	Selected	75 294	
	Non-selected	41 729	

Table 37: The dependent variable is the return to risk ratio, defined under variables. The independent selection variable is "family firm", including all family firms. We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

H3B Dependent variable: risk-return ratio		Corrected model	Selection variable Entrepreneurial family firm
Control variables	roa_1	2,6188***	0,0485
		(0,0835)	(0,0359)
	company size_1	-0,1213	0,2857***
		(0,1069)	(0,0090)
	leverage_1	-0,6863***	0,0744***
		(0,0539)	(0,0220)
	asset intensity_1	0,3496***	-0,2968***
		(0,1111)	(0,0089)
	company age	0,0439	-0,1270***
		(0,0463)	(0,0014)
	tangibility	-0,5723***	0,4425***
		(0,1773)	(0,0285)
	age ceo	-0,0012	-0,0023***
		(0,0015)	(0,0006)
Year effect	growth in GDP	3,1353**	-3,4484***
		(1,3806)	(0,2762)
Industry	AFFM	-0,2812	0,1545*
		(0,2030)	(0,0830)
	MACH	-0,2327	-0,0480
		(0,1872)	(0,0792)
	ICOR	-0,2343	0,1294*
		(0,1891)	(0,0776)
	LOGI	-0,1671	0,4192***
		(0,2422)	(0,0798)
	TRAD	-0,1933	0,3466***
		(0,2222)	(0,0774)
	SERV	0,0755	-0,1501*
		(0,1915)	(0,0781)
	HEDU	0,1853	0,2332***
		(0,2153)	(0,0845)
	constant	-1,5348***	-0,2719**
		(0,5821)	(0,1359)
	lambda (inverse Mills ratio)	-0,5991	
		(0,4859)	
	Number of observations	117 023	
	P-value	0,0000	
	Selected	17 043	
	Non-selected	99 980	

Table 38: The dependent variable is the return to risk ratio, defined under variables. The independent selection variable is "entrepreneurial family firms". We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Appendix 9 – Main Switching Regressions Model

H2A - switching regressions

Dependent variable: volatility in revenue		Family firm = 1	Family firm = 0	Selection
Control variables	roa_1	-0,0066	0,0083	-0,0648**
		(0,0065)	(0,0091)	(0,0323)
	company size_1	-0,0627***	0,0429***	-0,2205***
		(0,0013)	(0,0021)	(0,0069)
	leverage_1	0,0172***	0,0319***	-0,0351**
		(0,0035)	(0,0050)	(0,0173)
	herfindahl index	0,2699***	-0,4110***	1,5342***
		(0,0030)	(0,0056)	(0,0178)
	number of owners	-0,0028***	0,0022***	-0,0130***
		(0,0002)	(0,0002)	(0,0009)
	asset intensity_1	0,0323***	-0,0123***	0,0947***
		(0,0013)	(0,0019)	(0,0065)
	company age	0,0003***	-0,0024***	0,0053***
		(0,0001)	(0,0001)	(0,0004)
	tangibility	-0,0040	-0,0841***	0,1458***
		(0,0042)	(0,0061)	(0,0212)
	age ceo	-0,0003***	-0,0003***	0,0002
		(0,0001)	(0,0001)	(0,0004)
Year effect	growth in GDP	-0,0363	0,3747***	-1,0417***
		(0,0392)	(0,0552)	(0,1947)
Industry	AFFM	0,0144	0,0020	0,0720
		(0,0133)	(0,0178)	(0,0638)
	MACH	-0,0066	0,0197	-0,0274
		(0,0126)	(0,0168)	(0,0604)
	ENGY	0,0131	0,3262***	-1,1967***
		(0,0496)	(0,0519)	(0,2099)
	ICOR	0,0146	0,0238	-0,0089
		(0,0125)	(0,0166)	(0,0599)
	LOGI	-0,0024	0,0179	-0,0302
		(0,0129)	(0,0172)	(0,0618)
	TRAD	-0,0086	-0,0122	0,0247
		(0,0125)	(0,0166)	(0,0598)
	SERV	-0,0376***	0,0516***	-0,1755***
		(0,0126)	(0,0167)	(0,0601)
	HEDU	-0,0352***	0,0468**	-0,1378**
		(0,0136)	(0,0183)	(0,0657)
	constant	0,4823***	-0,3250***	1,6162***
		(0,0216)	(0,0305)	(0,1073)
	rho	0,9981***	-0,9986***	
		(0,0001)	(0,0001)	
	sigma	0,2773***	0,2103***	
		(0,0013)	(0,0007)	
	Number of observations	81 982		
	P-value	0,0000		
Likelihood-ratio test of independence between the three equations, P>Chi2		0,0000		

Table 39: The dependent variable as a measure of risk is volatility in revenue, defined under variables. The independent selection variable is "family firm", including all family firms. We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, the Herfindahl index, number of owners, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Cohort Sample

Year		roa	revenue	net income	volatilty revenue	leverage	return to risk ratio	# owners	herfindahl	equity	total assets	tangibility	asset intensity	total debt	company age	age ceo	company size
2000	*mean*	0,068	6 418 029	198 318	,	0,323	0,369	3,06	0,56	667 349	3 276 067	0,248	14,212	1 301 417	1,000	42,347	14,854
	median	0,080	2 726 188	74 200	,	0,250	0,133	2,00	0,50	245 125	1 440 275	0,136	14,180	310 050	1,000	42,000	14,929
	standard deviation	0,247	29 500 000	794 254	,	0,305	1,544	5,49	0,27	3 212 976	7 807 324	0,283	1,172	3 947 431	0,000	10,048	1,359
	observations	1 486	1 486	1 486	,	1 486	1 486	1 486	1 486	1 486	1 486	1 486	1 486	1 486	1 486	1 486	1 365
2001	*mean*	0,052	6 102 997	178 161	,	0,327	0,311	3,01	0,57	564 156	3 294 379	0,248	14,211	1 433 194	1,463	42,461	14,825
	median	0,081	2 599 740	63 063	,	0,233	0,152	2,00	0,50	229 086	1 438 866	0,137	14,179	298 584	1,000	42,000	14,885
	standard deviation	0,290	23 300 000	871 576	,	0,326	1,416	4,29	0,28	1 994 400	7 718 441	0,280	1,202	4 967 652	0,499	9,957	1,387
	observations	3 511	3 511	3 511	,	3 511	3 511	3 511	3 511	3 511	3 511	3 511	3 511	3 511	3 511	3 511	3 253
2002	*mean*	0,062	6 868 243	247 456	,	0,328	0,372	2,94	0,57	596 882	3 667 878	0,240	14,277	1 509 178	2,455	43,450	14,894
	median	0,089	2 893 432	80 709	,	0,229	0,221	2,00	0,50	236 406	1 558 246	0,123	14,259	320 292	2,000	43,000	14,973
	standard deviation	0,287	25 300 000	1 293 195	,	0,344	1,401	3,55	0,28	2 283 870	9 050 784	0,277	1,232	5 543 867	0,502	9,945	1,434
	observations	3 626	3 626	3 626	,	3 626	3 626	3 626	3 626	3 626	3 626	3 626	3 626	3 626	3 626	3 626	3 382
2003	*mean*	0,045	6 648 744	168 026	0,449	0,344	0,503	2,86	0,58	524 977	3 421 797	0,231	14,193	1 488 429	2,410	43,177	14,839
	median	0,076	2 727 039	66 906	0,314	0,243	0,310	2,00	0,50	199 479	1 440 957	0,111	14,181	309 750	2,000	42,000	14,922
	standard deviation	0,307	19 700 000	1 518 131	0,440	0,384	1,550	3,21	0,28	2 386 481	8 825 674	0,275	1,240	5 516 235	1,085	9,958	1,454
	observations	8 581	8 581	8 581	2 800	8 581	8 581	8 581	8 581	8 581	8 581	8 581	8 581	8 581	8 581	8 581	8 045
2004	*mean*	0,050	7 228 491	257 051	0,376	0,351	0,658	2,81	0,58	546 801	3 761 974	0,219	14,253	1 567 836	2,790	43,737	14,892
	median	0,082	2 944 858	88 920	0,216	0,247	0,498	2,00	0,50	187 720	1 527 078	0,098	14,239	333 450	3,000	43,000	14,977
	standard deviation	0,310	22 400 000	1 897 003	0,433	0,436	1,554	2,91	0,29	4 106 091	12 100 000	0,269	1,252	5 696 084	1,362	10,032	1,483
	observations	10 876	10 876	10 876	2 887	10 876	10 876	10 876	10 876	10 876	10 876	10 876	10 876	10 876	10 876	10 876	10 303
2005	*mean*	0,046	6 965 335	243 917	0,386	0,359	0,563	2,85	0,59	825 303	3 724 439	0,214	14,228	1 576 046	2,854	43,858	14,853
	median	0,072	2 795 715	75 330	0,217	0,258	0,383	2,00	0,50	284 310	1 466 505	0,094	14,198	348 705	3,000	43,000	14,928
	standard deviation	0,298	20 200 000	1 823 611	0,456	0,405	1,525	3,33	0,29	5 709 663	13 200 000	0,269	1,245	6 155 450	1,396	10,093	1,458
	observations	10 725	10 725	10 725	1 295	10 725	10 725	10 725	10 725	10 725	10 725	10 725	10 725	10 725	10 725	10 725	10 183
2006	*mean*	0,043	7 890 013	327 122	0,421	0,348	0,462	2,59	0,62	1 189 445	4 564 481	0,200	14,373	1 816 476	2,759	44,210	14,959
	median	0,074	3 119 536	95 312	0,298	0,239	0,334	2,00	0,50	352 912	1 700 804	0,078	14,347	372 232	3,000	43,000	15,033
	standard deviation	0,306	24 200 000	3 349 724	0,402	0,445	1,459	3,05	0,29	16 100 000	25 200 000	0,262	1,244	8 456 458	1,405	10,200	1,454
	observations	10 748	10 748	10 748	4 105	10 748	10 748	10 748	10 748	10 748	10 748	10 748	10 748	10 748	10 748	10 748	10 200
2007	*mean*	0,070	6 775 357	279 941	0,366	0,311	0,497	2,50	0,65	1 194 521	4 448 673	0,206	14,366	1 724 412	2,552	44,437	14,856
	median	0,089	2 841 390	115 542	0,247	0,197	0,353	2,00	0,51	387 891	1 713 087	0,081	14,354	294 750	2,000	43,000	14,951
	standard deviation	0,289	20 400 000	7 754 224	0,366	0,427	1,441	2,99	0,30	14 800 000	23 900 000	0,268	1,215	10 500 000	1,373	10,272	1,447
	observations	12 547	12 547	12 547	3 136	12 547	12 547	12 547	12 547	12 547	12 547	12 547	12 547	12 547	12 547	12 547	11 852
2008	*mean*	0,037	6 208 958	186 909	0,393	0,309	0,366	2,40	0,68	1 213 468	4 233 683	0,214	14,321	1 677 192	2,585	44,613	14,793
	median	0,071	2 623 024	67 024	0,274	0,179	0,222	2,00	0,55	376 016	1 617 664	0,085	14,296	246 512	2,000	44,000	14,883
	standard deviation	0,321	14 400 000	2 709 945	0,384	0,369	1,499	2,88	0,30	16 500 000	25 400 000	0,277	1,219	11 800 000	1,299	10,389	1,440
	observations	14 008	14 008	14 008	4 293	14 008	14 008	14 008	14 008	14 008	14 008	14 008	14 008	14 008	14 008	14 008	13 139
2009	*mean*	0,040	5 586 790	180 349	0,363	0,310	0,540	2,36	0,69	1 259 647	4 346 195	0,213	14,290	1 783 210	2,791	44,915	14,670
	median	0,070	2 383 016	68 944	0,210	0,166	0,367	2,00	0,63	383 640	1 585 712	0,080	14,277	214 616	3,000	44,000	14,793
	standard deviation	0,299	13 400 000	5 559 371	0,423	1,118	1,480	3,13	0,30	15 900 000	34 100 000	0,278	1,214	22 200 000	1,308	10,492	1,466
	observations	14 736	14 736	14 736	3 872	14 736	14 736	14 736	14 736	14 736	14 736	14 736	14 736	14 736	14 736	14 736	13 811
2010	*mean*	0,038	5 442 561	209 525	0,409	0,308	0,535	2,32	0,70	1 250 060	4 321 674	0,208	14,247	1 810 683	3,010	45,316	14,633
	median	0,065	2 311 551	67 332	0,256	0,153	0,357	2,00	0,68	373 584	1 517 142	0,076	14,232	194 394	3,000	44,000	14,741
	standard deviation	0,302	14 200 000	1 873 059	0,436	2,119	1,469	3,03	0,30	17 700 000	40 900 000	0,274	1,224	28 400 000	1,384	10,531	1,460
	observations	14 970	14 970	14 970	6 893	14 970	14 970	14 970	14 970	14 970	14 970	14 970	14 970	14 970	14 970	14 970	14 100
2011	*mean*	0,039	5 594 141	217 023	0,409	0,296	0,573	2,34	0,70	962 481	3 829 889	0,204	14,209	1 667 730	2,968	45,209	14,645
	median	0,068	2 360 544	69 680	0,259	0,165	0,403	2,00	0,68	346 256	1 468 640	0,074	14,200	204 752	3,000	44,000	14,758
	standard deviation	0,299	13 500 000	1 082 066	0,434	0,395	1,481	3,15	0,30	4 613 562	27 800 000	0,271	1,235	23 900 000	1,429	10,519	1,478
	observations	14 541	14 541	14 541	6 737	14 541	14 541	14 541	14 541	14 541	14 541	14 541	14 541	14 541	14 541	14 541	13 800
2012	*mean*	0,049	6 080 063	251 094	0,411	0,287	0,692	3,65	0,70	1 062 277	3 738 243	0,200	14,244	1 405 682	3,454	45,798	14,687
	median	0,074	2 520 855	77 745	0,269	0,147	0,516	2,00	0,68	395 115	1 525 080	0,071	14,238	192 765	3,000	45,000	14,817
	standard deviation	0,295	15 200 000	1 243 619	0,423	0,447	1,493	16,73	0,30	5 177 665	13 100 000	0,269	1,253	7 615 878	1,148	10,470	1,510
	observations	10 717	10 717	10 717	5 910	10 717	10 717	10 717	10 717	10 717	10 717	10 717	10 717	10 717	10 717	10 717	10 204
2013	*mean*	0,034	6 293 953	214 026	0,408	0,279	0,606	3,47	0,71	1 070 403	3 659 202	0,195	14,226	1 386 831	3,939	46,370	14,691
	median	0,066	2 530 318	63 623	0,275	0,141	0,452	2,00	0,68	399 469	1 521 737	0,068	14,235	182 525	4,000	46,000	14,819
	standard deviation	0,303	16 600 000	990 449	0,403	0,405	1,478	15,52	0,30	4 209 340	10 400 000	0,265	1,276	6 625 366	0,835	10,434	1,536
	observations	7 321	7 321	7 321	5 793	7 321	7 321	7 321	7 321	7 321	7 321	7 321	7 321	7 321	7 321	7 321	6 984
2014	*mean*	0,050	6 269 056	228 437	0,364	0,267	0,682	3,10	0,71	1 211 721	3 740 941	0,190	14,231	1 304 529	4,447	46,887	14,707
	median	0,071	2 594 361	78 617	0,216	0,131	0,508	2,00	0,82	419 631	1 526 395	0,062	14,238	177 654	4,000	46,000	14,830
	standard deviation	0,271	15 700 000	1 600 648	0,407	0,380	1,484	10,37	0,30	5 705 673	13 300 000	0,264	1,272	6 965 740	0,497	10,260	1,517
	observations	4 121	4 121	4 121	3 720	4 121	4 121	4 121	4 121	4 121	4 121	4 121	4 121	4 121	4 121	4 121	3 932
2015	*mean*	0,029	6 830 023	237 409	0,355	0,271	0,729	2,59	0,71	1 223 439	3 825 411	0,190	14,199	1 307 758	5,000	47,377	14,704
	median	0,068	2 585 000	67 000	0,208	0,132	0,558	2,00	0,82	426 000	1 531 000	0,063	14,241	168 000	5,000	47,000	14,839
	standard deviation	0,321	20 400 000	1 406 045	0,405	0,397	1,594	5,39	0,30	6 815 047	15 900 000	0,264	1,319	7 093 217	0,000	10,373	1,588
	observations	2 059	2 059	2 059	1 932	2 059	2 059	2 059	2 059	2 059	2 059	2 059	2 059	2 059	2 059	2 059	1 949
Total	*mean*	0,045	6 358 808	227 951	0,398	0,316	0,535	2,70	0,66	1 018 270	4 002 925	0,211	14,267	1 623 672	2,897	44,700	14,769
	median	0,074	2 618 973	76 728	0,254	0,190	0,370	2,00	0,52	323 190	1 550 340	0,085	14,254	251 920	3,000	44,000	14,869
	standard deviation	0,301	18 200 000	3 373 857	0,417	0,851	1,492	6,70	0,30	11 600 000	24 200 000	0,272	1,237	15 400 000	1,378	10,360	1,472
	observations	144 573	144 573	144 573	53 373	144 573	144 573	144 573	144 573	144 573	144 573	144 573	144 573	144 573	144 573	144 573	136 502

Table 40: The table presents year-by-year descriptive statistics of mean, median, standard deviation and number of observations for the main sample for all firm types on all main variables. Revenue, net income, equity, total assets and total debt is denominated in NOK.

Appendix 11 – Descriptive Statistics Survival Analysis

Cohort	Year	Entrepreneurial family firm	Classical family firm w/ family ceo	Classical family firm w/o family ceo	Non - family firm
Beginning(1)	2000	324	597	72	493
	2001	359	635	98	535
	2002	370	637	101	549
	2003	370	624	145	560
End(1)	2004	348	591	94	475
Beginning(2)	2001	457	716	83	628
	2002	480	732	91	658
	2003	589	890	155	802
	2004	547	812	121	684
End(2)	2005	456	639	114	620
Beginning(3)	2002	1	4	1	2
	2003	563	692	117	756
	2004	604	732	112	785
	2005	491	624	95	705
End(3)	2006	422	382	89	771
Beginning(4)	2003	613	789	112	804
	2004	656	838	130	854
	2005	590	719	138	784
	2006	496	438	117	878
End(4)	2007	492	532	73	547
Beginning(5)	2004	656	740	142	955
	2005	625	686	156	899
	2006	531	410	109	960
	2007	503	507	79	613
End(5)	2008	474	444	76	540
Beginning(6)	2005	650	705	129	900
	2006	672	470	144	1 153
	2007	692	680	112	744
	2008	630	598	98	639
End(6)	2009	583	530	94	564
Beginning(7)	2006	1 024	478	101	1 103
	2007	1 465	855	114	904
	2008	1 458	837	96	819
	2009	1 407	776	98	724
End(7)	2010	1 377	731	83	649
Beginning(8)	2007	1 593	847	111	1 084
	2008	1 632	883	148	1 089
	2009	1 527	808	123	938
	2010	1 426	734	116	815
End(8)	2011	1 335	667	104	722
Beginning(9)	2008	1 592	811	116	1 028
	2009	1 584	806	108	998
	2010	1 479	763	100	867
	2011	1 406	706	82	776
End(9)	2012	1 271	616	84	706
Beginning(10)	2009	1 413	701	105	849
	2010	1 400	707	113	817
	2011	1 348	646	107	732
	2012	1 235	554	90	687
End(10)	2013	1 152	525	72	592
Beginning(11)	2010	1 227	596	102	868
	2011	1 241	594	73	827
	2012	1 092	500	65	766
	2013	1 007	449	53	687
End(11)	2014	876	381	46	540
Beginning(12)	2011	1 392	662	127	994
	2012	1 309	609	131	1 002
	2013	1 245	563	106	870
	2014	1 065	486	62	665
End(12)	2015	977	427	55	600
	Total firms	54 799	38 111	6 088	45 575

Table 41: Number of firms in each cohort specified on firm type. One firm cannot appear in more than one cohort. A firm is born in the first year of its cohort and is five years in the last year. The sample consist of 12 cohort in the sample period from 2000 to 2015. The sample is unbalanced. In year 2002, cohort 3, there might be registration errors, hence the number of firms may be artificially low.

Appendix 12 – Heckman Self-Selection Models in Cohort Study

Dependent variable: ROA		Corrected model	Selection variable Entrepreneurial family firm
Control variables	company size_1	0,0193***	-0,0400***
		(0,0053)	(0,0037)
	leverage_1	-0,0143	-0,2162***
		(0,0295)	(0,0123)
	asset intensity_1	0,0700***	-0,0864***
		(0,0113)	(0,0046)
	company age	-0,0073***	0,0151***
		(0,0024)	(0,0030)
	tangibility	-0,1277***	-0,0359**
		(0,0087)	(0,0171)
	age ceo	-0,0011	0,0058***
		(0,0008)	(0,0004)
Year effects	growth in GDP	1,9073***	-5,7138***
		(0,7372)	(0,1820)
Industry	AFFM	-0,0224	0,1400***
		(0,0247)	(0,0373)
	MACH	0,0152	-0,0705*
		(0,0195)	(0,0365)
	ENGY	0,2796**	-0,8419***
		(0,1343)	(0,0886)
	ICOR	-0,0514*	0,2105***
		(0,0312)	(0,0334)
	LOGI	-0,0587	0,2846***
		(0,0404)	(0,0373)
	TRAD	-0,0961***	0,2003***
		(0,0299)	(0,0336)
	SERV	-0,0003	0,1273***
		(0,0224)	(0,0332)
	HEDU	-0,0246	0,3408***
		(0,0460)	(0,0358)
	constant	-0,7150***	1,2659***
		(0,0304)	(0,0603)
	lambda (inverse Mills ratio)	-0,4064**	
		(0,1879)	
	Number of observations	115 677	
	P-value	0,0000	
	Selected	44 893	
	Non-selected	70 784	

Table 42: The dependent variable as a measure of performance is ROA, defined under variables. The independent selection variable is "entrepreneurial family firm". We include the control variables company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Dependent variable: volatility in revenue		Corrected model	Selection variable Entrepreneurial family firm
Control variables	roa_1	0,2308***	0,2990***
		(0,0723)	(0,0215)
	company size_1	-0,2117***	-0,0594***
		(0,0143)	(0,0048)
	leverage_1	-0,0894**	-0,1464***
		(0,0402)	(0,0165)
	asset intensity_1	-0,0037	-0,0903***
		(0,0216)	(0,0062)
	company age	0,4621***	0,4992***
		(0,1091)	(0,0049)
	tangibility	-0,1411***	-0,0395*
		(0,0340)	(0,0227)
	age ceo	0,0039***	0,0060***
		(0,0015)	(0,0005)
Year effects	growth in GDP	-6,1188***	-6,5922***
		(1,4725)	(0,2578)
Industry	AFFM	0,1245*	0,0891*
		(0,0755)	(0,0495)
	MACH	-0,0478	-0,0524
		(0,0722)	(0,0480)
	ENGY	-0,9280***	-0,9106***
		(0,2873)	(0,1169)
	ICOR	0,3239***	0,2292***
		(0,0813)	(0,0436)
	LOGI	0,3113***	0,3078***
		(0,0976)	(0,0487)
	TRAD	0,2468***	0,2013***
		(0,0781)	(0,0440)
	SERV	0,1462**	0,1443***
		(0,0711)	(0,0434)
	HEDU	0,2480***	0,3228***
		(0,0970)	(0,0468)
	constant	-0,2530	-0,6757***
		(0,4087)	(0,0824)
	lambda (inverse Mills ratio)	1,4102***	
		(0,2980)	
	Number of observations	91 637	
	P-value	0,0000	
	Selected	20 853	
	Non-selected	70 784	

Table 43: The dependent variable as a measure of risk is volatility in revenue, defined under variables. The independent selection variable is "entrepreneurial family firm". We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Dependent variable: retrn to risk ratio		Corrected model	Selection variable Entrepreneurial family firm
Control variables	roa_1	0,5747***	0,3258***
		(0,1941)	(0,0152)
	company size_1	0,1381***	-0,0433***
		(0,0261)	(0,0037)
	leverage_1	-0,1004	-0,1273***
		(0,0832)	(0,0129)
	asset intensity_1	0,3604***	-0,1122***
		0,0662	(0,0047)
	company age	-0,0433***	0,0164***
		(0,0118)	(0,0030)
	tangibility	-0,5699***	-0,0325*
		0,0413	(0,0171)
	age ceo	-0,0054	0,0056***
		(0,0033)	(0,0004)
Year effects	growth in GDP	9,078***	-5,7661***
		(3,3563)	(0,1822)
Industry	AFFM	-0,4736**	0,2823***
		(0,1860)	(0,0347)
	MACH	-0,0873	0,0786**
		(0,0910)	(0,0339)
	ICOR	-0,4935**	0,3518***
		(0,2209)	(0,0305)
	LOGI	-0,5631**	0,4269***
		0,2648	(0,0347)
	TRAD	-0,6927***	0,3465***
		(0,2174)	(0,0309)
	SERV	-0,1772	0,2683***
		(0,1752)	(0,0304)
	HEDU	-0,1543	0,4758***
		(0,2868)	(0,0332)
	constant	-3,8204***	1,5009***
		(0,2373)	(0,0618)
	lambda (inverse Mills ratio)	-2,0368**	
		(0,8479)	
	Number of observations	115 677	
	P-value	0,0000	
	Selected	44 893	
	Non-selected	70 784	

Table 44: The dependent variable is the return to risk ratio, defined under variables. The independent selection variable is "entrepreneurial family firm". We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Appendix 13 – Switching Regressions Models in Cohort Study

Switching regressions cohort Dependent variable: ROA		Entrepreneurial family firm = 1	Entrepreneurial family firm = 0	Selection
Control variables	company size_1	0,0045***	0,0043***	-0,0154***
		(0,0015)	(0,0012)	(0,0034)
	leverage_1	0,0679***	-0,0828***	-0,2432***
		(0,0048)	(0,0038)	(0,0108)
	asset intensity_1	0,0305***	-0,0060***	-0,0614***
		(0,0019)	(0,0015)	(0,0043)
	company age	-0,0075***	0,0031***	0,0173***
		(0,0012)	(0,001)	(0,0027)
	tangibility	-0,2037***	-0,1205***	0,0953***
		(0,0068)	(0,0055)	(0,0157)
	age ceo	-0,0013***	0,0016***	0,0050***
		(0,0002)	(0,0001)	(0,0003)
Year effect	growth in GDP	1,6173***	-0,6532***	-4,4935***
		(0,0726)	(0,0582)	(0,1665)
Industry	AFFM	-0,0426***	0,0403***	0,1325***
		(0,0150)	(0,0117)	(0,0343)
	MACH	-0,0418***	-0,0289**	-0,0168
		(0,0147)	(0,0113)	(0,0334)
	ENGY	0,0970**	-0,0313	-0,3121***
		(0,0402)	(0,0197)	(0,0750)
	ICOR	-0,0945***	0,0462***	0,2042***
		(0,0134)	(0,0105)	(0,0306)
	LOGI	-0,1042***	0,0538***	0,2312***
		(0,0149)	(0,0118)	(0,0342)
	TRAD	-0,1436***	-0,0090	0,1900***
		(0,0135)	(0,0105)	(0,0308)
	SERV	-0,0288**	0,0235**	0,1014***
		(0,0133)	(0,0104)	(0,0304)
	HEDU	-0,0455***	0,0903***	0,2666***
		(0,0143)	(0,0114)	(0,0329)
	constant	0,0557**	0,2285***	0,5885***
		(0,0251)	(0,0192)	(0,0564)
	rho	-0,9541***	0,9409***	
		(0,0009)	(0,0010)	
	sigma	0,4120***	0,3739***	
		(0,0018)	(0,0012)	
	Number of observations	115 677		
	P-value	0,0000		
Likelihood-ratio test of independence between the three equations, P>Chi2		0,0000		

Table 45: The dependent variable as a measure of performance is ROA, defined under variables. The independent selection variable is "entrepreneurial family firm". We include the control variables company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Switching regressions cohort Dependent variable: volatility in revenue		Entrepreneurial family firm = 1	Entrepreneurial family firm = 0	Selection
Control variables	roa_1	0,0515***	-0,1144***	0,1998***
		(0,0100)	(0,0087)	(0,0217)
	company size_1	-0,0412***	-0,0246***	-0,0381***
		(0,0024)	(0,0021)	(0,0054)
	leverage_1	-0,0363***	0,0554***	-0,1084***
		(0,0071)	(0,0062)	(0,0153)
	asset intensity_1	-0,0256***	0,0586***	-0,0852***
		(0,0028)	(0,0024)	(0,0060)
	company age	0,0068**	-0,0429***	0,0471***
		(0,0030)	(0,0026)	(0,0064)
	tangibility	-0,0577***	-0,0489***	-0,0676***
		(0,0100)	(0,0088)	(0,0217)
	age ceo	0,0004*	-0,0016***	0,0023***
		(0,0002)	(0,0002)	(0,0005)
Year effect	growth in GDP	-1,4614***	1,5471***	-3,5965***
		(0,1215)	(0,1037)	(0,2578)
Industry	AFFM	0,0124	0,0005	0,0353
		(0,0212)	(0,0184)	(0,0455)
	MACH	-0,0043	-0,0060	-0,0004
		(0,0204)	(0,0176)	(0,0437)
	ENGY	-0,3170***	0,3195***	-0,8088***
		(0,0396)	(0,0286)	(0,0780)
	ICOR	0,0481***	-0,0206	0,0942**
		(0,0186)	(0,0162)	(0,0400)
	LOGI	0,0625***	-0,0677***	0,1716***
		(0,0208)	(0,0181)	(0,0448)
	TRAD	0,0581***	-0,0843***	0,1663***
		(0,0188)	(0,0163)	(0,0404)
	SERV	0,0181	-0,0398**	0,0766*
		(0,0185)	(0,0161)	(0,0397)
	HEDU	0,0269	-0,0907***	0,1399***
		(0,0200)	(0,0174)	(0,0430)
	constant	0,8881***	-0,1037***	1,2997***
		(0,0393)	(0,0336)	(0,0853)
	rho	0,9987***	-0,9973***	
		(0,0001)	(0,0003)	
	sigma	0,4587***	0,4147***	
		(0,0027)	(0,0020)	
	Number of observations	51 433		
	P-value	0,0000		
Likelihood-ratio test of independence between the three equations, P>Chi2		0,0000		

Table 46: The dependent variable as a risk is volatility in revenue, defined under variables. The independent selection variable is "entrepreneurial family firm". We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.

Switching regressions cohort Dependent variable: return to risk ratio		Entrepreneurial family firm = 1	Entrepreneurial family firm = 0	Selection
Control variables	roa_1	1,0199***	1,1478***	0,3244***
		(0,0340)	(0,0228)	(0,0151)
	company size_1	0,0801***	0,0817***	-0,0432***
		(0,0068)	(0,0054)	(0,0037)
	leverage_1	-0,2830***	-0,2833***	-0,1262***
		(0,0241)	(0,0174)	(0,0128)
	asset intensity_1	0,2081***	0,1500***	-0,1130***
		(0,0111)	(0,0073)	(0,0048)
	company age	-0,0204***	-0,0025	0,0166***
		(0,0052)	(0,0042)	(0,0030)
	tangibility	-0,6090***	-0,4918***	-0,0322**
		(0,0295)	(0,0233)	(0,0171)
	age ceo	0,0021***	0,0021***	0,0056***
		(0,0008)	(0,0005)	(0,0004)
Year effect	growth in GDP	1,3112***	1,4393***	-5,7688***
		(0,4928)	(0,3136)	(0,1822)
Industry	AFFM	-0,0820	-0,1573***	0,2817***
		(0,0671)	(0,0440)	(0,0347)
	MACH	0,0186	-0,1695***	0,0777**
		(0,0643)	(0,04100)	(0,0339)
	ICOR	-0,0054	0,0710*	0,3512***
		(0,0619)	(0,0387)	(0,0305)
	LOGI	0,0260	-0,0016	0,4261***
		(0,0698)	(0,0458)	(0,0347)
	TRAD	-0,2145***	-0,1795***	0,3455***
		(0,0625)	(0,0392)	(0,0309)
	SERV	0,1972***	0,0266	0,2675***
		(0,0597)	(0,0380)	(0,0304)
	HEDU	0,4909***	0,1503***	0,4753***
		(0,0683)	(0,0450)	(0,0332)
	constant	-3,3853***	-2,7219***	1,5099***
		(0,1147)	(0,1255)	(0,0621)
	rho	-0,0385	0,0765*	
		(0,0700)	(0,0434)	
	sigma	1,3711	1,3760	
		(0,0052)	(0,0045)	
	Number of observations	115 677		
	P-value	0,0000		
Likelihood-ratio test of independence between the three equations, P>Chi2		0,3945		

Table 47: The dependent variable is the return to risk ratio, defined under variables. The independent selection variable is "entrepreneurial family firm". We include the control variables roa lagged one year, company size lagged one year, leverage lagged one year, asset intensity lagged one year, company age, tangibility, age of CEO and growth in GDP as proxy for year effect. The variables AFFM, MACH, ENGY, ICOR, LOGI, TRAD, SERV and HEDU controls for industry effects. Asterisks denote statistical significance at <1% (***), <5% (**) or <10% (*), respectively. Standard errors are reported in parenthesis under the respective coefficients.